

Chemical Age



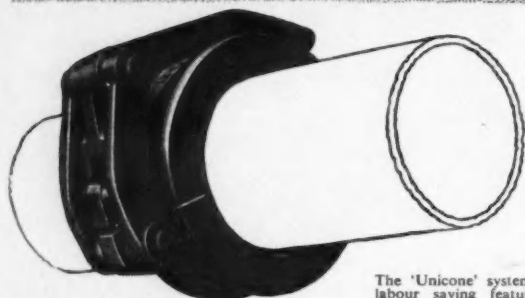
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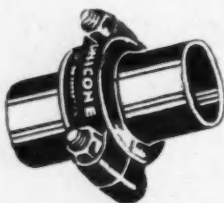
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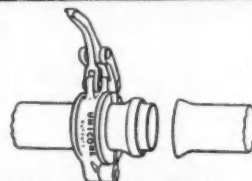
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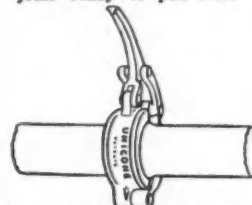
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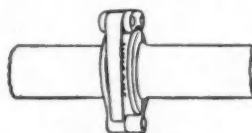
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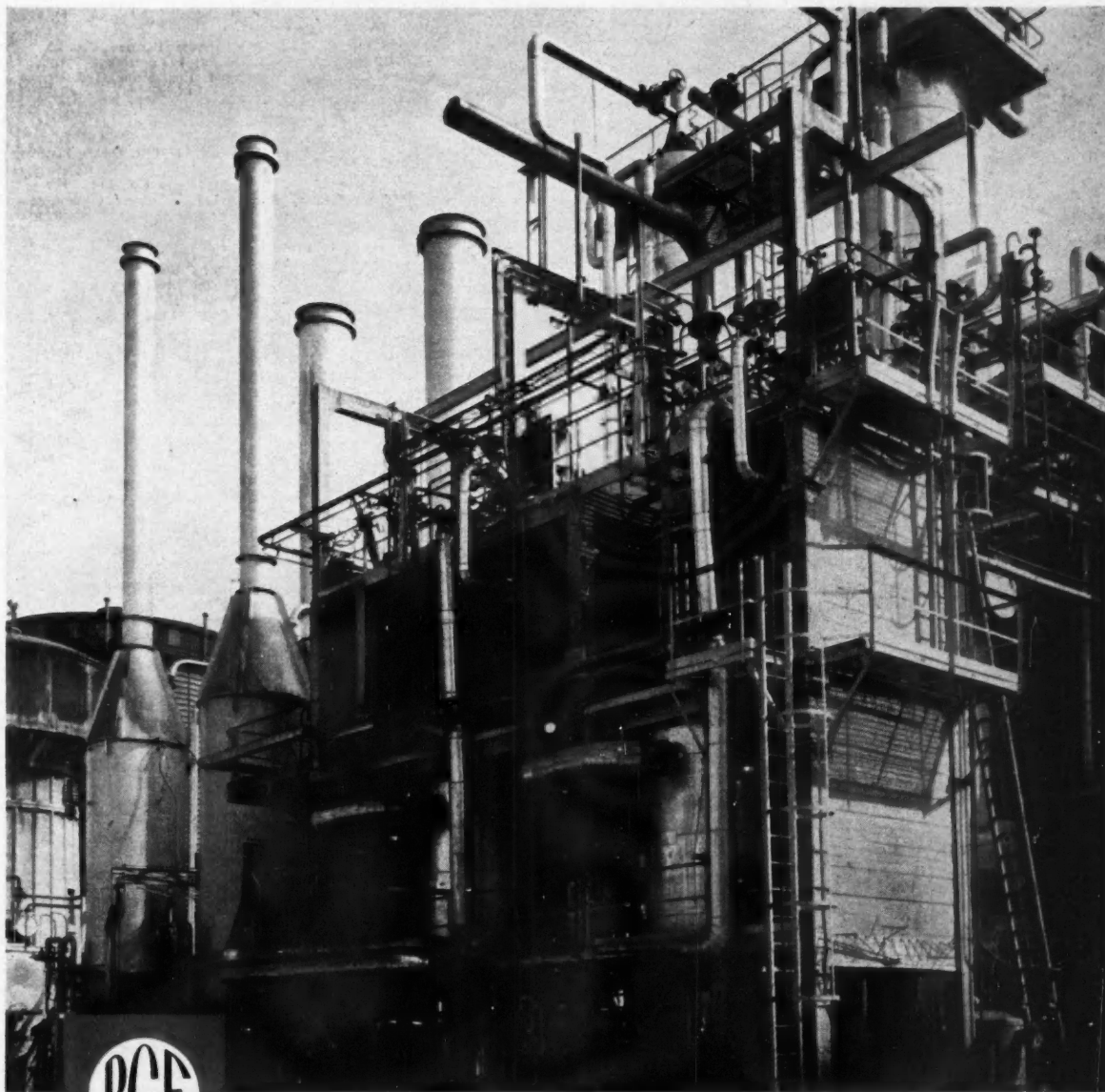
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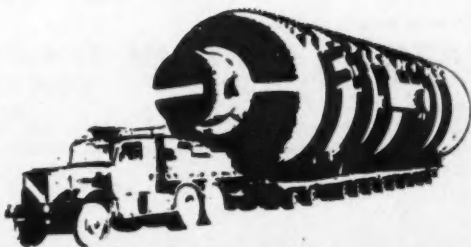


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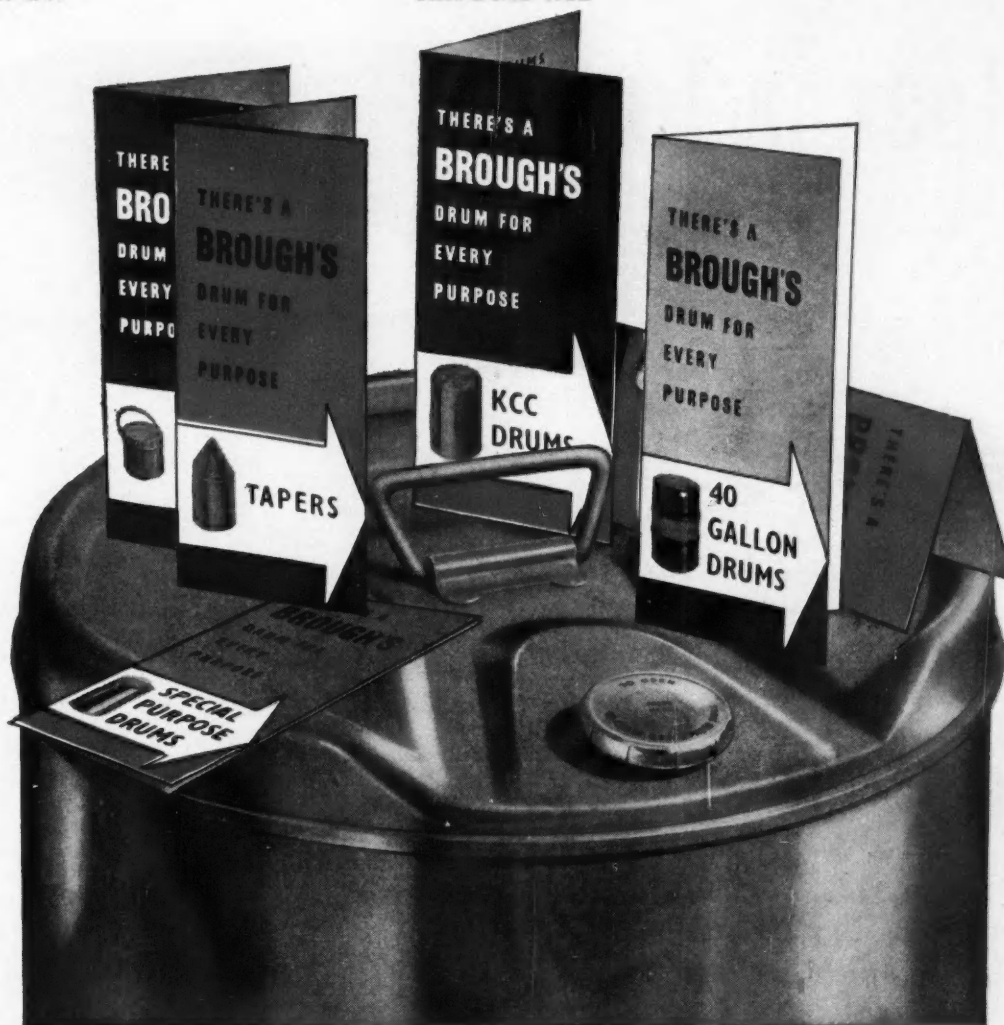
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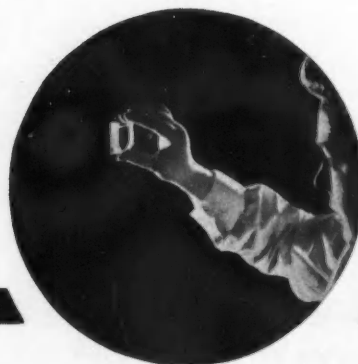
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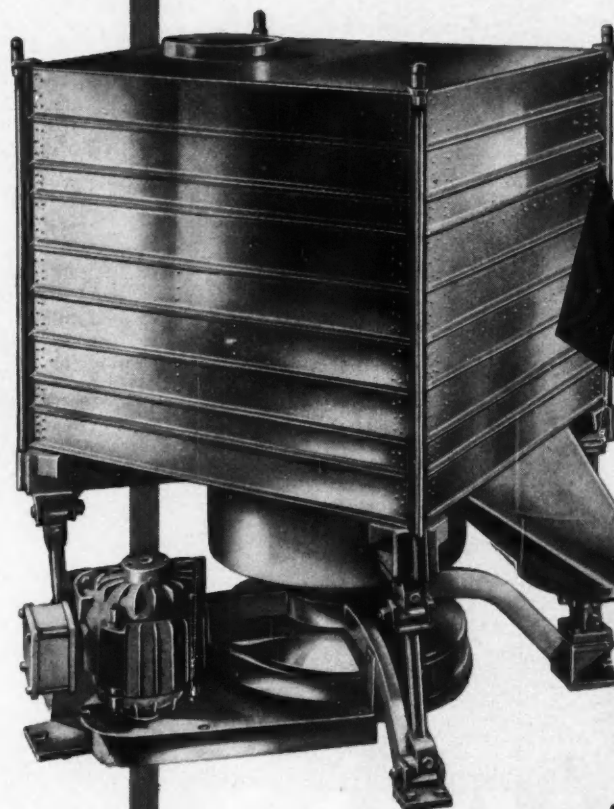
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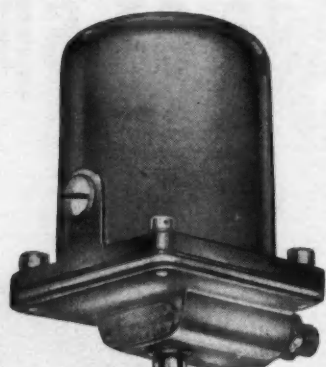
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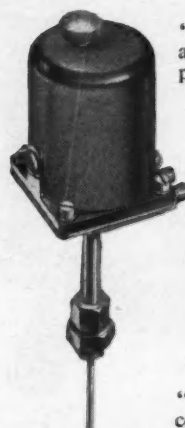
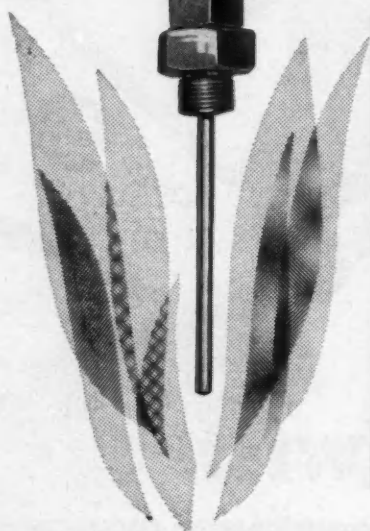


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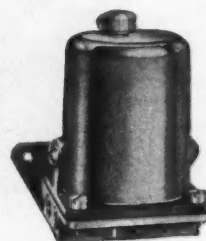
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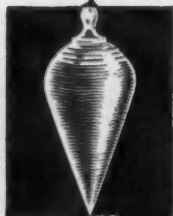
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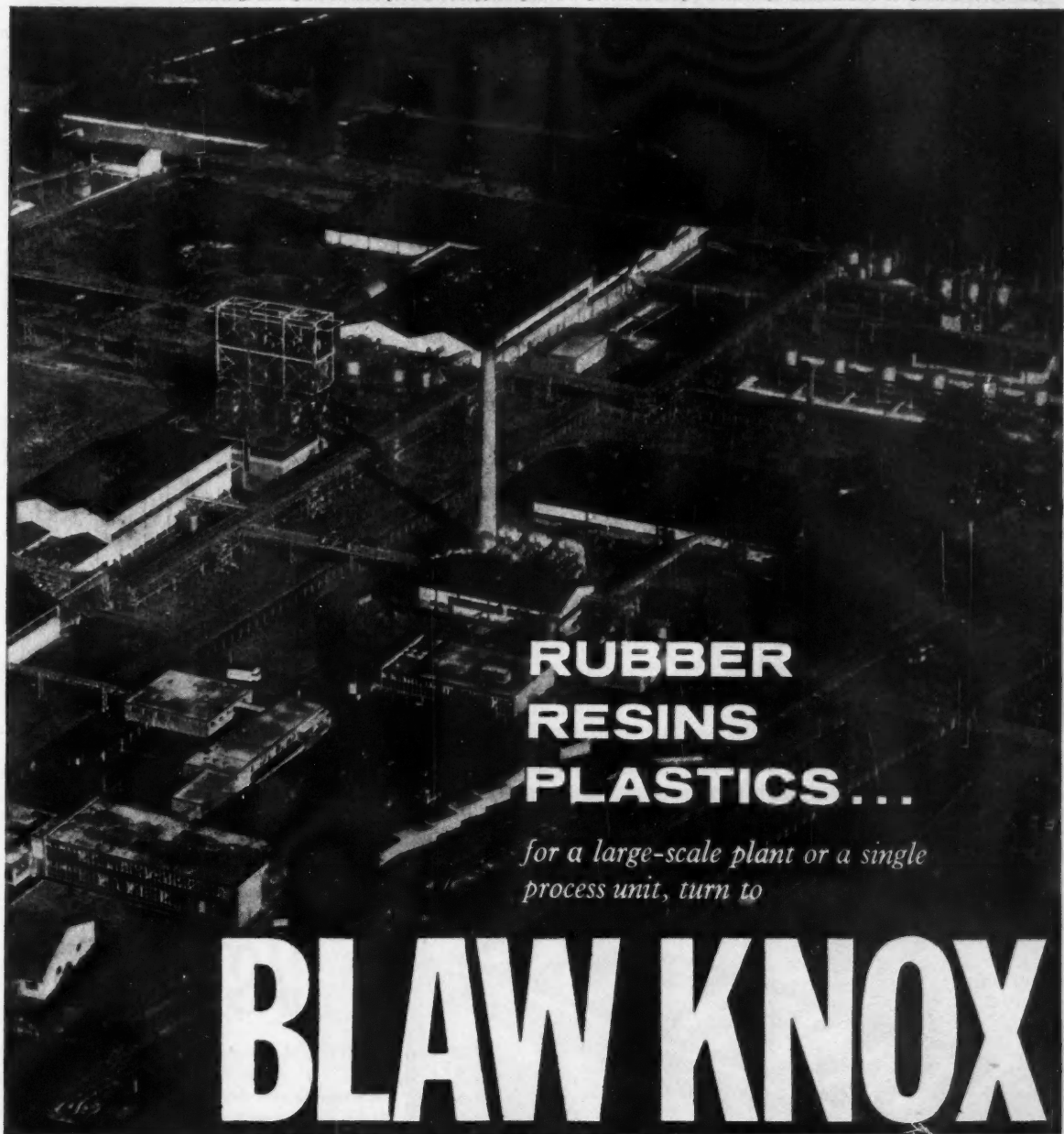


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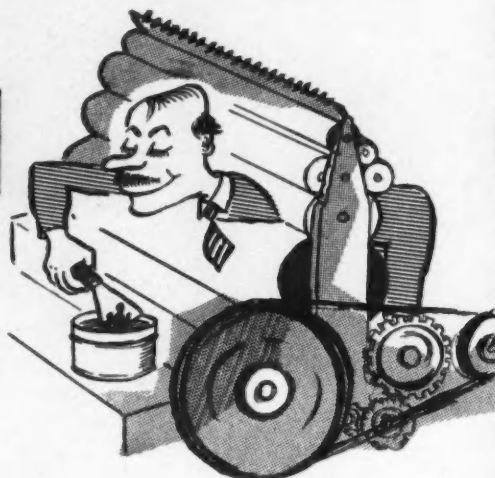
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CHEMICAL AGE

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COAL GASIFICATION

NOW that the Scottish Gas Board's big plant for the high-pressure gasification of coal by the Lurgi process is nearing completion and is expected to start gas-making in about seven months from now, it is time to consider how the pattern of gas production in other parts of the U.K. is likely to be influenced by the Westfield experiment. The trend is definitely towards integration of gas-making facilities in a smaller number of large, economical plants, rather than a great number of small plants, but does the Lurgi process provide the complete answer?

It depends, of course, on whether plants using the Lurgi process—which is generally acknowledged to be the most economical and successful coal gasification process available to the gas industry—can be sited so conveniently near plentiful supplies of coal of the right sort, as the Westfield plant is. This is a problem which was touched upon by several speakers at the recent annual meeting of the Institution of Gas Engineers, following the presentation of Mr. T. S. Ricketts' paper on the Westfield plant (reviewed in *CHEMICAL AGE* last week, p. 1010). For instance, Dr. J. Burns (deputy chairman, North Thames Gas Board) asked what was to be done with small concentrations of coal up and down the country, which are booked for gasification only. A small amount of coal does not do, with Lurgi plant, and it is not economic to carry the coal about the countryside. Dr. Burns thought it would be preferable to gasify these small quantities of coal in plants which do not require oxygen, and to have this gasification gas purified from sulphuretted hydrogen, but under low pressure to a central collecting point where the gas could be pruned to its proper quality and enriched to the proper calorific value.

This led to the question of what to use in the future for enrichment gas. It does appear on present showing, that imported methane and imported propane/butane are likely to be most suitable forms of enrichment gas. Dr. Burns thought the Lurgi process would have to "work very hard" to keep its place, in view of these alternatives.

The false impression, cherished in some quarters, that the Lurgi plant would gasify any kind of low-grade coal was dispelled by Mr. G. le B. Diamond (chairman, West Midlands Gas Board), as was the similarly erroneous idea that the Lurgi plant is particularly sensitive and selective in its coal requirements. The truth, as shown by the specification given in Mr. Ricketts' paper, lies half-way.

Mr. H. D. Greenwood (N.C.B.) had some interesting comments about the cost of the Lurgi process, and pointed out that, if the Lurgi gas is not treated to convert the CO and to remove the CO₂, there is a considerable saving in cost, possibly as much as 2d a therm or more. A crude gas of that type would be quite suitable for many industrial processes, so why should not the gas industry supply a crude industrial gas in suitable areas of heavy industrial concentration, provided the price was competitive? Mr. Greenwood thought, also, that the Lurgi plant of the future might well supply different types of gas for different purposes; it might have an output of 100 to 200 cu. ft./day, and, to avoid coal transport

costs, there might be slagging generators at a number of adjacent pits drawing oxygen from a central point and feeding crude gas to a central treatment plant.

Mr. Greenwood's forward-thinking proposal concerning the supply of crude Lurgi gas to industrial users was made before the Labour Party's surprising announcement about its projected policy of re-converting oil-fired industrial plants to coal; otherwise there might have been some interesting discussion on this point at the meeting. At any rate, Mr. Greenwood has pointed out a fuel which is a possible alternative to oil and yet is based on coal, and which does not seem to have so far been considered by the planners.

PREVENTING CAKING IN SODIUM CHLORIDE

FLUCTUATIONS in the value of the relative humidity have a major effect on the caking process in sodium chloride. At a value higher than about 70%, salt crystals absorb moisture that forms a saturated solution on their faces. When the relative humidity decreases, some evaporation of saturated solution occurs, resulting in the formation of crystal growths on, and attached to, the faces of the old crystals, which thus become bonded. The firmer the bond, the greater is the degree of caking and hardness of the cake.

According to British Patent 818,385 (Imperial Chemical Industries Ltd., inventors, C. Allday and T. N. Belford), the caking tendency of common salt is minimised by modifying the deposition characteristics of the reprecipitated material so as to preclude the formation of strong bonds between the original crystals.

This modification is achieved by adding to the salt a substance which, in aqueous solution, gives rise to multi-valent complex anions. Complex co-ordination compounds of cobalt and of iron, complex cyanides of chromium and ruthenium, cobaltinitrites, ferrioxalates, silicotungstates and complex cyanides of nickel (e.g., potassium nickelocyanide) are claimed as additives.

NON-RESIDUE INSECTICIDE

ONE of the main problems in the use of chemical insecticides has been the residues left on foliage and fruit, which are frequently toxic to man and animals and harmful to beneficial insects as well as pests. Moreover, insects can develop resistance to many of the insecticides commonly in use. However, a new type of insecticide has been introduced in Canada which may overcome this difficulty. The new insecticide preparations contain the spores of the bacterium *Bacillus thuringiensis*, which have long been known to kill insects in nature.

This insect-killing pathogen is unique in that it can kill both by infection and by a toxin contained in the bacterial spores. This toxin, first studied by Canadian scientists, paralyses the insect within a few hours of a moderate dose of bacterial spores. The insect, unable to feed, dies of starvation.

Two pounds of the spore preparation in 100 gall. of water was applied to apple trees with ordinary orchard spray equipment at the Kentville Research Station of the Canada Department of Agriculture in Nova Scotia. Over 90% of the winter moth larvae and 70% of the canker worms in apple were killed. Heavier applications gave about 50% control of grey-banded leaf roller. Tests are being continued this year.

The new insecticide appears to be quite specific for leaf and fruit eating insects and probably has little or no effect on parasites and predators. Extensive tests have shown that the higher animals and human beings are not

susceptible to either the infection of the bacteria or the toxic action of the spores, and, therefore, residues on fruit and foliage are of little concern. So far there has been no indication that insects develop resistance to this new type of insecticide.

B. thuringiensis is only one of a number of micro-organisms which have potential as insecticides, and hence this discovery may open up a whole new approach to insect control.

POLYMERISATION BY U.V. RADIATION

ALTHOUGH polymerisation of a number of crystalline vinyl monomers has been carried out in recent years by irradiation with γ -rays or high-energy electrons, there appears to be no report of the ultra-violet initiation of solid-state polymerisation. This was pointed out by workers at Courtauld's research laboratory in a letter to *Nature* of 28 May. C. H. Bamford, A. D. Jenkins and J. C. Ward have found that crystalline methacrylic acid may be polymerised by radiation from a high-pressure mercury arc using a quartz optical system, or with azobis-isobutyronitrile as a photosensitiser using a Pyrex glass system. This process could in principle throw some light on the mechanism of the reaction.

A sensitiser labelled with carbon-14 was used to trace the reaction, and it was shown that the rate of the early stages of the reaction are proportional to the first power of the light intensity and the concentration of the sensitiser. The efficiency of the initiation was estimated as being not very different from that found in liquid-phase polymerisations.

When irradiation is carried out in the presence of oxygen the polymerisation proceeds normally. The propagating radicals in the solid must be inaccessible to oxygen since liquid-phase photopolymerisation is strongly inhibited by oxygen. The degrees of polymerisation of the polymers, determined viscometrically, varied rather erratically but were generally around 4,000, independent of the rate of initiation.

SEA CONTAMINATION BY OIL

IN view of the current interest being shown by doctors and public health authorities in contamination of beaches and estuaries, it is interesting to note that a team of chemists, working in collaboration with a Hamburg firm, has developed a powder which when sprayed on oil-contaminated water is said to sink the oil to the bottom never to rise again.

The powder, patented under the name of Oilsink, is a pulverised mixture of various solvent minerals and cementing additives. When sprayed over the water surface by compression or carrier gas the powder combines with the oil to sink it in solidified flakes which mix with bed sludge after an alteration in the oil film's specific gravity. It can also be used in filters for the absorption of oil from oil-water mixtures. The powder is almost completely insoluble in water and results in no ill effects to flora and fauna. The sunken oil cannot possibly rise to the surface again. Tests with harbour sludge after treatment with Oilsink showed that no great difference had taken place in the growth-preventive properties of untreated bed sludge.

The same group of chemists has also produced a spray powder, marketed under the trade name of Novästhol which within a few seconds breaks down foam banks formed on watercourses. The Oilsink preparation is marketed by N. E. Wilhelmsen and Co., Hamburg 13, and produced under the licence Speiko-Kripke of Dr. Speier and Co. GmbH, Hamburg-Wandsbek.

Project News

I.C.I.'s New Nitric Acid Plant Completed

● **EVERYTHING** is ready for the new I.C.I. nitric acid plant to start production at Ardeer. Different sections of the plant, which will manufacture nitric acid by intermediate oxidation, have been tried out over the past few months, and all the instruments have been calibrated. Last week particularly has been one of great activity for the technical department team which will set the plant in operation and the engineering headquarters team which has supervised the erection of the plant. The design of the plant is one which has proved its worth in the Dutch State Mines, and at Ardeer at the moment to assist in the commissioning trials, which are underway, is Mr. H. Smit, an experienced nitric acid engineer who works with the Dutch company.

● **A BASIC** slag works, costing £500,000, is to be built by Scottish Agricultural Industries Ltd. at Scunthorpe, Lincs. It will be located on three acres of land on the west side of the Richard Thomas and Baldwins Ltd. steel works, and will be able to produce up to 120,000 tons/year of high grade slag. This will be processed by S.A.I. for agricultural purposes. The new factory is expected to come into operation by the spring of 1961.

● **WILLIAM BOBY AND CO. LTD.**, water treatment engineers of Rickmansworth, Herts, have been awarded a contract valued at £5,691 by the South of Scotland Electricity Board for the demineralisation plant for Braehead Power Station.

● **CONSTRUCTION** is to proceed on a gas holder contracts valued at about £1 million which have recently been received by P. G. Engineering Ltd. from clients in the U.K. and overseas.

The most recent contract received is for a 3 million cu. ft. A.B.P.-Klonne Tyte gas holder to be installed at John Lysaght's Scunthorpe works. This holder will store blast furnace gas and is planned for completion by the end of 1961.

Richard Thomas and Baldwins have also ordered two A.B.P.-Klonne gas holders from P. G. Engineering associates, Ashmore, Benson, Pease and Co. P. G. Engineering will carry out this work.

One holder will store 5 million cu. ft. of blast furnace gas and the second 2 million cu. ft. of coke-oven gas, at the new Spencer works at Llanwern, near Newport.

Five column-guided gas holders to serve the large fertiliser factory in India are also included in the recent contracts. One will have a capacity of 15,000 c.m. and each of the other four 5,000 c.m. This order was obtained by the company's Bombay office which will supervise erection and sub-contract the manufacture in India.

Fisons Seek Increased Trade with East Europe

Soviet delegation at Fisons' Levington Research Station. For names see below



BELIEF that there is increasing scope for day-to-day trade with Poland and Czechoslovakia in the wide variety of complex modern chemicals "without which efficient production in many industries would be impossible," is held by Fisons Chemicals (Export) Ltd., who are exploring the opportunities for increased trade with East Europe.

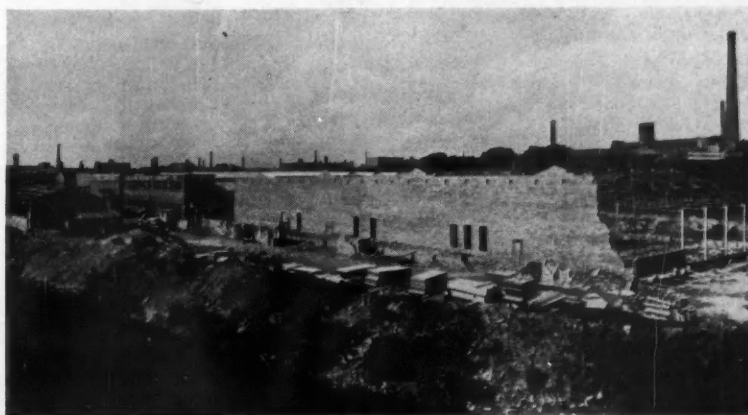
One of Fisons Chemicals' European sales executives, Mr. D. A. Diamond, arrived in Poland last week and will spend the rest of the month in that country and in Czechoslovakia. At the Poznan Fair he is contacting technical and commercial personnel from other East European countries. In Warsaw he will visit Ciech, the Foreign State Trading Organisation and technical departments concerned with the chemical industry. In Prague he will have discussions with Chemapol and with technical experts from various plants.

Fisons state the sales through a State trading organisation are inevitably more

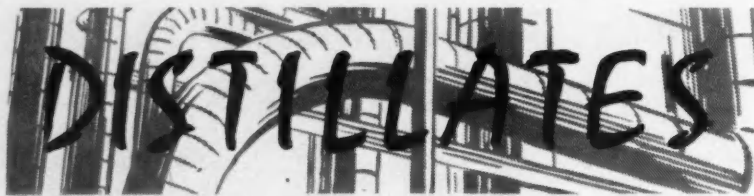
complicated, but even if success is not immediate and spectacular they hope it will be sure but steady.

Soviet scientists touring Britain as guests of Fisons Fertilizers visited Levington Research Station. In the photograph, above, they are shown with Dr. J. G. Hunter, deputy research director (back to camera) in the soil chemistry laboratory. Left to right they are: P. I. Gorbie, head, Sumy superphosphate works; A. P. Kevorkov, All Union Scientific Research Institute of Fertilisers and Agricultural Soil Chemistry; Dr. J. R. Arthur, head, Chemistry Department; Dr. J. A. Storrow, director of the station, and E. A. Sawyer, export manager of Fisons Fertilizers; Miss S. S. Kostikova, interpreter; Miss L. F. Nikitina, chief of laboratory, Chemical Combine of Nitrogenous Fertilisers, Stalinogorsk; and N. N. Postnikov, head of the delegation, and a chemical engineer with the Scientific Institute of Fertilisers and Insecto-Fungicide.

Acheson Extend Dukinfield Plant



Building in progress at the Dukinfield (Cheshire) works of Acheson Dispersed Pigments Co., where pigment masterbatches and concentrates for the plastics industry are manufactured. In a little more than two years the company has outgrown its plant capacity and is extending the works by about 25,000 sq. ft. to provide space for new plant. A.D.P. say the extension is needed to meet increased demand



★ WEDNESDAY last week was a busy day for *CHEMICAL AGE*. As I left London Airport for the S.C.I. Overseas Section meeting in Ballykelly, a colleague was flying in from Belfast and a visit to the new Carbide Industries plant. The Brussels meeting was one of the most successful the section has held. Certainly it must have been the most impressive.

A reception in the Brussels City Hall and a dinner in the magnificent Royal Museums of Art and History, with three Cabinet Ministers present, provided a memorable setting for an occasion that was presided over by a Belgian president of the S.C.I.—Anglophile E. J. Solvay. The following evening, M. Solvay—head of what must be the world's largest chemical organisation, with a turnover reportedly in excess of £100 million a year, that is still a private company—entertained members and their ladies at a reception at his home, the Chateau de la Hulpe.

Much credit for the success of the meeting must go to Dr. Leslie Streatfield, section chairman, Mr. F. J. Braybrook, hard-working hon. secretary, and their committee, as well as to M. Solvay and his staff. A sense of humour on the part of Professor Cockelbergs saw him through awkward moments during a most interesting paper. A prolonged 'technical hitch' with the projector was followed almost at once by a compressor working full blast in a nearby courtyard! Sir Eric Rideal, the other distinguished speaker, had no such problems.

★ MANY S.C.I. members who attended the Frankfurt meeting last year missed the Brussels meeting, being in Moscow for the international conference on polymers—among them being Sir Harry Melville, D.S.I.R. secretary. Among the 1,500 scientists in Moscow from 26 countries, were 62 from the U.K.

Papers were given in three sections: synthesis of polymers, polymerisation and polycondensation, and chemical transformation in polymer chains. Soviet papers on polymers with semi-conductor qualities were heard with interest, for U.S.S.R. workers have made important developments in this field.

Also in Moscow, the I.C.I. Plastics Division exhibition has closed on 17 June after being crowded each day. So heavy was the demand for publicity material, that it had to be carefully

rationalised despite the fact that 7½ tons were brought from the U.K. The technical papers aroused so much discussion that questions too had to be limited. The exhibition will now be moved to Leninograd where it will open on 15 July.

★ WITH the inauguration of the new Sanatogen plant at Coleraine on the same day that the Carbide Industries plant was opened (see p. 1059), the name of Fisons Milk Products has been changed to Fisons Foods Ltd. Manufacturing rights for Sanatogen were purchased in 1916 by a specially formed company, Genatosan Ltd. For a while production was carried out in Cornwall, but in 1921 was moved to Loughborough, Leics.

The decision to move to Northern Ireland was taken last year, and by March the plant was again in full operation. The Coleraine factory was built by Bengel Laboratories (acquired by Fisons in 1947) to process potatoes in the latter part of the war. Apart from being the largest single U.K. producers of full cream milk powder, the company now produces butter, cheese and tinned cream. Fisons Foods are under the care of Genatosan.

★ THE British Exhibition at the Coliseum, New York, is the most ambitious attempt yet made to show the U.S. that the U.K. is not exclusively inhabited by Beefeaters, Chelsea Pensioners, policemen and village yokels (a fixation firmly implanted in the American mind by the British Tourist Association advertising) but, on the contrary, is the leading industrial nation in the world in technical inventiveness, originality, workmanship and design.

American curiosity, thus so sharply aroused, has been translated into thousands of visitors to the Coliseum. All exhibitors to whom my correspondent spoke have been impressed with the serious and thoughtful interest these visitors have been taking. Great firms as diverse as I.C.I., Vickers and Harris Lebus occupy the second floor, and the same variety continues on the third where is the special British motor industries display, British Insulated Cables and Molins Machine Co. Americans goggle, unbelieving, at their own cigarettes being made by the million and packed before their eyes on British continuous flow machines.

On the top floor are the British 'pubs', one of Emmett's fantastic railways, and

the Periodical Proprietors' Association stands, to mention four only of the best attended exhibits. My correspondent's pleasure at watching Americans paying dollars for *CHEMICAL AGES*, *British Trade Journals*, etc., needs no explanation.

To mention the men chiefly responsible for the first large-scale joint attack on the U.S. market by a truly representative cross-section of British industry is dangerous. Necessarily omitting many who must have done sterling work in arranging and mounting the exhibition, my correspondent at least gives credit from first-hand personal knowledge to Lord Rootes, chairman of the Dollar Exports Council, and Mr. (soon to be Sir) William McFadzean, president, F.B.I., joint 'fathers' of the whole enterprise from its earliest conception; Sir Hugh Stephenson, H.M. Consul General, who should have left in April to take up a new appointment at the Foreign Office, but preferred to stay in New York and to see the show through, and Mr. W. P. N. (Bill) Edwards, managing director of British Overseas Fairs Ltd.

★ EVERY firm in the chemical industry, whether manufacturing or merchandising, buys print in one form or another, usually through its publicity or sales departments. Heads of these departments will, I am sure, be interested in the newly published first edition of the *Printing and Allied Trades Directory*.

The only publication of its kind it lists the names and addresses of nearly 9,000 printers in the U.K., indicating wherever possible the classes of work undertaken. Names are arranged both in alphabetical and geographical order, providing the print buyer with a selection of firms suitable for his purpose in the area he requires.

This directory, price £2 2s, postage extra, is published by Benn Brothers Ltd., publishers of *CHEMICAL AGE*, in association with the monthly journal *Printers' Sales and Wants Advertiser*.

★ IN publishing 'The Raw Materials of Progress' (see p. 1060), Laporte Industries Ltd. have taken a big step forward in informing employee, shareholder and user, of what the group is doing and how it goes about it. This is Laporte's first venture of this kind and it looks as though it will be highly successful.

As Mr. P. D. O'Brien, chairman, told a private audience on Tuesday evening when he introduced the book, it is particularly important for the British chemical industry, which works so hard and invests so much money to produce things essential to modern civilisation, but which the public never sees, to let the "other fellow know what it is doing".

Alembic

CARBIDE INDUSTRIES OPEN ACETYLENE PLANT IN NORTHERN IRELAND

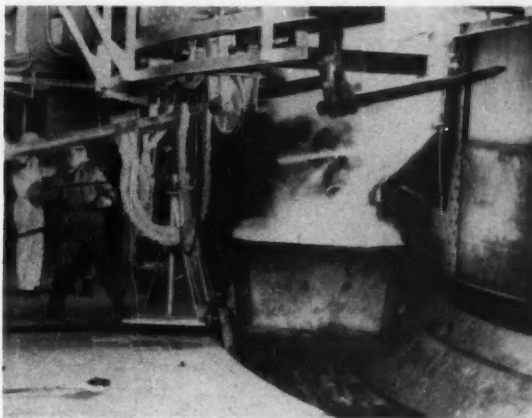
"An example of Anglo-American enterprise" was how Lord Chandos described the arrangement whereby Carbide Industries Limited will provide the acetylene required by du Pont for the production of neoprene. Lord Chandos, chairman of the Northern Ireland Development Council, was opening C.I.L.'s new carbide and acetylene plant at Maydown, Londonderry, last week.

The Maydown plant is not the first venture of British Oxygen, of which group Carbides Industries is a member, into the carbide field. The company have made carbide in Norway for many years and have also over the years considered its manufacture in other places, but it was not until du Pont showed interest in bulk supplies of acetylene and the site at Londonderry was indicated that these schemes were put into operation.

The building of the factory in Northern Ireland is welcomed locally as it will help reduce the high unemployment rate. Apart from the 300 people who will work at the factory itself most of whom were recruited locally in spite of some shortage of tradesmen in the area, there is, as Lord Chandos pointed out, the incidental employment of shops and public services, including the electric power requirements of the plant which represent a load greater than that needed by a town like Londonderry itself.

The plant was designed and built by British Oxygen Engineering, who are also a member of the British Oxygen Group. The calcium carbide is produced by the usual method of reacting lime and carbon in an electric furnace. The coke and limestone are imported by sea, the

The carbide furnace being tapped. The molten carbide is at a temperature of 2,000°C



limestone from Colwyn Bay and the coke from a Midlands coal field. A wharf, shared by C.I.L. and du Pont has been specially constructed at Lough Foyle for the purpose.

The coke is dried in rotary kilns to a low moisture content and the limestone converted to calcium oxide in a gas fired lime kiln. The coke and lime are automatically weighed and fed into the furnace by gravity through hoppers in the proportion of approximately 3:2.

The furnace, a totally closed rotating type supplied by Elektrokemist A/S of Oslo, operates on the submerged electric arc principle at a temperature of 2,000°C. The electrodes consist of carbon blocks in steel casing and are 52 in. in diameter.

The white-hot, molten carbide is tapped from the furnace and, after cooling and crushing to the required size, is placed in large storage bunkers.

Facilities are provided for the grinding and packing of carbide for sale but the majority is used in the continuous acetylene generators, where it is mixed with water. The compressed acetylene is pumped to the nearby du Pont factory.

The C.I.L. plant, which has been in production now for about six weeks, will eventually produce 50,000 tons of carbide a year. At the moment most of it is scheduled to meet du Pont's acetylene needs but, as only 25 acres of the 60-acre site have been utilised so far

there is plenty of room for expansion. For instance, the possibility of an outlet for the by-product lime hydrate, which at the moment is being dumped, will be investigated.

A point of interest in the C.I.L.-du Pont relationship is that the supply of acetylene to du Pont is the first "tonnage" supply project in the U.K., that is to say, the first instance in which tons of gas are pumped to the customer instead of being delivered in cubic feet amounts in tankers or cylinders.

The cost of this new British Oxygen venture is not officially disclosed, but Carbide Industries say it is estimated in millions.

Three New Aureomycin Veterinary Products

THREE new Aureomycin veterinary products have been introduced by Cyanamid of Great Britain Ltd., Bush House, Aldwych, London W.C.2. They are: Aureomycin powder 2% (containing 1% benzocaine) for the prevention and treatment of bacterial infections of wounds, moist skin infections and in infectious kerato-conjunctivitis in large animals; Aureomycin ointment 3%, a general wound dressing ointment; and Aureomycin ophthalmic ointment 1%, now being marketed for the first time in a veterinary pack.

Aureomycin chlortetracycline is produced at the Cyanamid laboratories, Gosport, Hants. The existing range of Aureomycin and Achromycin veterinary medicines is to be extended and the possible use of other veterinary products is being studied. The veterinary sales force has recently completed training, each representative having spent some time attached to a veterinary practice.

Man Killed at Explosives Research Station

Mr. Ernest Yard of Enfield was killed, and Mr. L. G. Coles and Mr. J. C. Hampton, both of Waltham Cross, were injured in an explosion on 11 June at the Ministry of Aviation's Explosives Research and Development Establishment, Waltham Abbey, Essex. All were laboratory workers. The explosion was stated to have occurred during the decontamination of plant.



A general view of the Carbide Industries plant

LAPORTE PUBLISH NEW BOOK TO HELP WIDEN KNOWLEDGE OF U.K. CHEMICAL INDUSTRY

FROM the hydrogen peroxide works that Belgian emigré Bernard Laporte started at Shipley in the 1880's to one of the largest British chemical groups comprising 11 companies, employing 4,000 people and operating 16 production units in this country, Australia and Canada, is the story of Laporte Industries Ltd. It is told in a new book entitled 'The Raw Materials of Progress' that L.I.L. shareholders received on Wednesday with their copies of the annual report.

The book has been published as a contribution to a wider knowledge of the British chemical industry and copies are also being sent to users and a version of the book in the form of a special number of the Laporte magazine is being issued to employees.

Apart from giving a general outline of the company's work and its history, the book is split into three sections: 'The group'; 'The raw materials of progress' and 'The future'.

Laporte Industries are now the largest U.K. producers of hydrogen peroxide; one of the largest producers of sulphuric acid; the largest producer of fullers' earth; large-scale manufacturers of titanium oxide; and the main or only producers in a wide range of industrial chemicals. Group investments in plant and equipment now represent some £12 million out of a total capital of £20 million. In recent years, Laporte have been investing in new plant at the rate of £1.5 million a year. In some of the newer plants investment in equipment totals £20,000 per head per process worker.

Group Products

In the section on 'The raw materials of progress', are described in non-technical language the products of the major products of the group, with a summary of the processes used and notes on their development. Discussing the importance of using construction material of the highest purity on the auto-oxidation hydrogen peroxide plant, the book states that in the plant's early days trouble in a heat exchanger was traced to the presence of copper in the cooling water at a concentration of only 0.02 p.p.m.

Sulphuric acid production was started at Luton in the second world war and is now also made at the Stallingborough titanium oxide plant at Hunslet, Castleford, Sheffield and Rotherham. Both the chamber and the contact processes are used and Laporte utilise sulphur, pyrites, and spent oxide as raw materials, thereby ensuring a continuity of supply and a complete range of acid of all specifications, strengths and qualities. New uses for the acid are constantly arising, and the Hunslet research laboratory is continuously studying both the properties and applications and methods of produc-

tion. The group also has a large output of hydrochloric acid and hydrofluoric acid.

Work is now in hand adjoining the titanium plant at Stallingborough on the fourth major extension since building started there in 1950. The third set of extensions, completed in 1958, was expected to be adequate until at least 1961; but although capacity in 1958 was 15 times larger than the Group's titanium oxide production in 1945, it was shortly again working to full capacity. The latest scheme, costing £3.5 million, will raise output at Stallingborough by a

Johnson Matthey's Acid Hard Gold Plating for Printed Circuits

A NEWLY developed acid hard gold plating bath that produces not only a hard durable gold deposit but one that will have no injurious action on plastic laminates, has been announced by Johnson Matthey and Co. Ltd., 73-83 Hatton Garden, E.C.1. This is the result of the demand for such a bath created by the ever increasing use of printed circuits in the electronics industry.

Johnson Matthey say that their bath produces gold deposits of optimum durability on most grades of printed circuit and entirely overcomes the principal defect of conventional gold plating baths—failure of the laminate bond due to the effect of the high free cyanide content of the plating solution. Furthermore, the gold electrodeposited from the new bath has a Vickers hardness in the range of 120-130.

Acid hard gold is supplied as a concentrated solution, which is diluted to make up the plating bath. Insoluble anodes of platinum or platinum plated titanium are used in the bath. Stainless steel anodes must not be used as corrosion of the steel leads of contamination of the solution. For like reasons, the bath should be contained in glass, earthenware or plastic vats.

The recommended cleaning method is to scour the work with a stiff bristle brush using pumice powder in water, which action will not only remove oxide film but also any traces of grease.

In order to ensure good adhesion it is advantageous to deposit a thin layer of copper from a sulphate bath on work to be plated, though printed circuits with copper laminates may be plated direct. It is preferable, in all cases, to make the work cathodic before immersion in the bath to eliminate the possibility of chemical replacement deposits being formed.

During the plating process the pH of

further 20,000 tons/year.

Other products referred to in the book are fullers' earth, sodium perborate, industrial detergents, barium compounds, organic peroxy compounds (now 'tailor-made' in a special section of the Warrington plant), sodium sulphate, sodium thiosulphate, and a range of inorganic fluorine compounds. The number and scope of the company's chemicals is said to be increasing continuously.

Discussing the future, the book points to the importance of research and development. It is stated that at Warrington the AO hydrogen peroxide plant was in a single operation, developed on a scale some 40 to 50 times larger than the pilot unit, compared with the usual practice that demands a scale-up of not more than 10 times the pilot plant. Greater attention is to be paid in the future to problems of automatic process control as a means of raising output and greater product consistency.

the bath should be measured regularly with a pH meter and maintained within the range 6-7 by the periodic addition of a few drops of weak phosphoric acid solution. Relatively stress-free deposits are obtained by operating the bath at 50°C or above with a current density of not less than 3 amp/sq. ft. The weight deposited per amp-hr. is 5.15 gm.

In Parliament

Minister Not Aware of Problem with Photocopying Chemicals

When Parliament reassembled after the Whitsun recess Mr. Barnett Janner (Lab., Leicester N.W.) asked the Minister of Labour whether he was aware that certain chemicals used in photocopying, such as trichloroethylene and tricresyl phosphate had anaesthetic effects and proved to be drugs of addiction; and whether in view of the fact that photocopying work was often carried out by young people in basement rooms he was taking steps to warn employers concerned.

The Parliamentary Secretary, Mr. Peter Thomas, replied that he was not aware of any such problem.

Big Attendance at Third Gas Chromatography Symposium

Third International Gas Chromatography Symposium held recently in Edinburgh was most successful, with by far the biggest attendance of the three, at 560. About 150 applications had to be rejected in order to keep the numbers down to ensure reasonable comfort and adequate discussion facilities. The Scottish Section, Society for Analytical Chemistry played a big part in organising this event.

S.C.I. MEETING IN BRUSSELS



At the annual dinner, l. to r., Mrs. Moore, Mr. F. J. Moore (I.C.I. Fibres Division, London), Mr. H. V. Potter (Bakelite Ltd.), Mrs. Barrett, Mrs. Potter, Dr. J. W. Barrett (Monsanto

Chemicals Ltd.), Dr. Leslie Streatfield (Houseman and Thompson Ltd.), section chairman, Mrs. Streatfield, and M. E. J. Solvay (Solvay et Cie), S.C.I. president

Eighty-five British Members Attend Overseas Section Meeting

BRUSSELS meeting of the Overseas Section, Society of Chemical Industry, proved another successful occasion for the section committee. Although only two papers were presented they were of a high calibre and the social events proved particularly notable, the highlight being a banquet, the section's eighth, held in the Salle d'Honneur of the Royal Museums of Art and History, and attended by a distinguished company that included three cabinet ministers and King Baudouin's chief of cabinet.

After the banquet on 16 June, those present were taken on a tour of the collections at the Museums. Eighty-five S.C.I. members travelled from the U.K. for the meeting, many accompanied by their wives. On 15 June they were received with section members from other countries by the Burgomaster of Brussels at the Town Hall.

First of the two papers was given by Professor R. J. Cockelbergs, Professor of General Chemistry at the Royal Military College, who spoke on 'Radiation, a new possibility for the chemical industry.' As reported below, this was a realistic survey of the field, particularly the restrictive effect that economics have had on the development so far of the use of ionising radiations in the chemical industry. But Professor Cockelbergs was optimistic about prospects and thought that in the near future a break through would occur in the field of polymer chemistry.

Sir Eric Rideal, a past-president of the S.C.I., who gave the second paper on 'The role of chemical research in the university and in industry' was strongly of the opinion that any thought that research must have a practical view in mind should be firmly resisted.

Four works visits were arranged: to the Jemeppe factory of Solvay et Cie, the Brussels laboratories of European Research Associates—affiliated to Union Carbide, but carrying on sponsored research for a number of other firms, the Neder-over-Heembeek laboratories of Solvay and to S.A. Photo-Produit Gevaert at Mortsel-Antwerp.

A ladies programme included a visit to Bruges and to the Chateau of the Princes de Ligne at Beloeil.

Final event of the meeting was a remarkable visit to Chateau de la Hulpe where M. E. J. Solvay received members

and guests. On the terrace overlooking the magnificent grounds, Dr. Leslie Streatfield, section chairman, presented M. Solvay with a set of Crown Derby ware on behalf of members.

Members of the S.C.I. Overseas Section committee are: Dr. E. L. Streatfield (Houseman and Thompson Ltd.), chairman; Mr. F. H. Braybrook (Shell International Chemical Co. Ltd.), honorary secretary and treasurer; with H. V. Potter (Bakelite Ltd.); C. P. Percy (J. M. Steel and Co. Ltd.); W. E. K.



Prof. R. J. Cockelbergs, Ecole Royale Militaire, left, with M. A. Leroux (director-general, Soc. Belge de l'Azote et des Produits Chimiques du Marly), president, Fédération des Industries Chimiques de Belgique, and Mme. A. Guilmet, whose husband is director of the federation

Piercy (Albright and Wilson Ltd.); Dr. G. P. Armstrong (Distillers Company Ltd.); W. A. M. Edwards (I.C.I.); Lt. Col. F. J. Griffin (S.C.I.); N. G. W. Luitz (Bataafsche Internationale Chemische Maatschappij).

Three Cabinet Ministers at Annual Dinner

ANNUAL dinner of the Overseas Section was held in the Salle d'Honneur Musées Royaux d'Art et d'Histoire, Brussels, and was attended by nearly 200 members, ladies and guests. M. Ernest Solvay, S.C.I. president, presided and welcomed members and guests with Dr. Leslie Streatfield, chairman, Overseas Section, and Mrs. Streatfield.

A speech of welcome was made by M. Solvay, to which M. Ch. Moureaux, Minister of Education, replied. Dr. Streatfield welcomed the guests, who included M. L. Camu, president, Anglo-Belgian Union, M. Cooremans, Burgomaster of Brussels, Mr. J. R. Cotton, U.K. Commercial Attaché in Brussels, M. P. Harmel, Minister of Cultural Affaires, M. A. Langbrown, Head of the Cabinet of the King of the Belgians, M. J. van der Schueren, Minister of Economic Affairs. Dr. Streatfield referred to the special significance of the dinner held in Brussels during M. Solvay's year of office as S.C.I. president.

Mr. Cotton replied for the guests in the absence of the British Ambassador, who takes up his appointment in the near future.

Before and after the dinner, those present were able to tour the art galleries.

Plastics and Rubber Institutes to Discuss Merger Possibility

The councils of the Institution of the Rubber Industry and the Plastics Institute have set up a liaison committee consisting of five representatives of each body to consider and report back on the advantages and disadvantages of closer co-operation and the practicability of amalgamation. The committee will report to the two councils later this year.



L. to r., A. J. Prince, former director at I.C.I. Heavy Organic Chemicals Division, now a consultant in France, Mrs. Prince, and F. H. Braybrook (Shell International Chemical Co.), hon. secretary, Overseas Section, Dr. H. Stach (Esso AG) and Dr. H. M. Ashton (Esso Research Ltd.)

Polymer Field May See First Commercial Use of Radiochemistry

IN a critical survey of irradiation processing, Professor Cockelbergs believed that polymer chemistry had a great opportunity to provide one of the first economically attractive industrial applications of radiation chemistry. Application of radiochemistry to large-scale chemical operations, such as nitrogen fixation, must await further investigations and a drastic lowering of costs.

Professor Cockelbergs gave the first paper at the meeting of the Overseas Section, entitled 'Radiation, a new possibility for the chemical industry', at the Société Royale Belge des Ingenieurs, Brussels, on 16 June. Two main characteristics underlie the use of irradiation techniques—that of energy and that of a purely chemical nature.

So far as energy was concerned, mass production was essential, but something more was needed. It was vital that enough kilowatts per hour should be available as 'ionising radiation at an acceptable net cost. On the chemical side, radiation techniques should be capable of producing either new products, or better ones, or new methods of production that had a definite economic advantage over traditional methods.

Radiation-induced reactions were characterised by a G value, which expressed a yield and which corresponded to the number of molecules that reacted for every 100 eV dissipated as ionising radiations. Radiochemical reactions with low G values accounted for most chemical reactions—in fact all the endothermic reactions and exothermic reactions that did not follow chain mechanisms. Generally G values as an order of magnitude approached unity.

High G value reactions corresponded to those that followed chain reactions, such as chlorination, oxidation, polymerisation, etc. The G value here depended on chain length and could range from a few units to several tens of thousands.

Giving some examples, Professor Cockelbergs instanced a low G value reaction in the case of a product with a molecular weight of 100. To achieve an output of 1 ton/day, a power slightly

above 1 MW had to be consumed in the system as ionising radiation. Any industrial operation, therefore, would require several tens of megawatts or more.

With the same basic data, and with a high G value of 1,000 units, the same daily output would need only 1 kW radiation power absorbed. Professor Cockelbergs pointed out that the gamma radiation power of a 100 curie cobalt 60 source corresponded to barely 0.7 watt.

Discussing the radiochemical fixation of nitrogen, he said that 90% of all the fixed nitrogen resulted from ammonia oxidation, producing nitric acid. The 'chemonuclear' process offered the advantage of direct synthesis from air, providing concentrated nitrogen peroxide. Unfortunately that advantage was offset by the cost of the chemonuclear plant. One of the biggest problems was the handling of large quantities of highly contaminated gaseous products. The process was uneconomic in comparison with conventional methods, although an improvement could be expected within 20 to 30 years, following further studies.

Conversion of CO₂ to CO was another potentially useful reaction. It was felt, however, that chemonuclear plants would be confined to a few key reactions producing chemicals with a large tonnage market, acetylene from methane, hydrogen peroxide, and the conversion of methane and ammonia to hydrocyanic acid. At present experimental data was not sufficient to comment on the feasibility of such reactions.

Professor Cockelbergs said that for power sources below 30 kW, the cost of the ionising radiation per kW/hour would be between \$1 and \$10. For applications in the mW range—based on the use of reactors as the radiation source—this could fall below 10 cents per kW/hour. In any event, without a drastic cut, it was doubtful that further economic applications would be achieved.

High G-value reactions offered the most attractive results. In the case of certain homogeneous phase reactions

such as halogenation, oxidation cracking, alkylation, etc., the advantage of using ionising radiations must be evaluated in comparison with photochemical induction or initiation methods which made use of molecules that on decomposition could start the necessary chain reactions. Whenever comparisons were possible, they were unfavourable to initiation by ionising radiation. A recent extensive literature search did not reveal any example of a high G-value reaction induced by ionising radiation.

It had, however, recently been shown that irradiation could induce processes that could not effectively be started in any other way, i.e., ion-molecule reactions in gaseous phase, reactions of molecules in excited states, etc. These studies might well lead to the discovery of reactions sufficiently specific to be economically attractive to the chemical industry. A very promising field was heterogeneous radiocatalysis, now under active study in Professor Cockelbergs' laboratories.

When a reacting system was initiated in the presence of solid surfaces, these often acquired a kind of catalytic activity. In some cases, the reaction yield increased while in others the catalyst induced a reaction selectivity. That phenomenon took place only in the presence of radiation and it was believed to represent a new tool of particular interest. Professor Cockelbergs was confident that either new chemicals would become possible, at least, that chemicals would be produced under purely specific conditions.

New Work in Heterogeneous Radiocatalysis

He thought that the polymer field would in the foreseeable future provide the first industrial application of irradiation techniques. In recent experiments, the concept of heterogeneous radiocatalysis had been applied to certain polymerisation reactions with results that appeared promising.

In conclusion, Professor Cockelbergs said that on balance ionising radiations did not appear very favourable. Radiation costs were high and would be so for some time—no wonder because radiation energy had a high potential and had to be developed for new applications. Further study in new applications would be a challenge to research workers in the coming years. He believed that in the foreseeable future the chemical industry would use the new techniques to a considerable extent.

Sir Robert Robinson, a former S.C.I. president spoke of the cross-linking of polymers by irradiation, which was not possible by any other method. It was also possible to irradiate polyolefins *in situ*, in the form of extrusions or mouldings.

Another speaker referred to the recent development of heat-shrinkable polythene film, produced in the U.S. by radiation techniques. As stated in CHEMICAL AGE, 8 April, this has been achieved by the Cryovac Division of W. R. Grace and Co.

Sir E. Rideal on New Discoveries That are 'Lost' in Industry

A DISTURBING feature of modern industrial research was referred to by Sir Eric Rideal, F.R.S., a past president of S.C.I., in his paper 'The role of chemical research in the university and in industry', presented at the meeting held on 17 June. Introduced by Professor Putzeys of Louvain University, Sir Eric dealt with his subject from a philosophical point of view.

He said that in industry, problems for research were frequently dissected into separate components in order to arrive at a swift solution. Often some new and interesting field of enquiry was opened up as a result of such specialised study. Unfortunately if some new aspect lay outside the domain of the organisation concerned, it tended to be lost in the records of the company. It was, declared Sir Eric, a great pity that findings of that nature could not be passed on to some other organisation or research institute particularly interested in the field for further study.

He spoke of the three paths that scientific research offered in the U.K. (1) Basic research in the universities; (2) applied research necessary for the progress and survival of industry; (3) State research. This pattern had been developed over the past 100 years, and recently the feeling had grown that these divisions tended to hinder the furtherance of science. The view had also been expressed that the universities and colleges should do nothing but teach and that research should be confined to industrial and Government laboratories.

Totalitarian Approach

Sir Eric spoke of the Soviet approach to research and the view held there that scientific endeavour should be restricted to fields that would help improve life in general. That was poles apart from the Western philosophy. The premise that research must have an applicational end should be resisted as strongly as possible. It was from an atmosphere of free enquiry that advances were most likely to come. In the totalitarian State it was possible to concentrate a large effort on a particular problem, but if it was not likely to be of an immediate or practical advantage to the State then it could not be investigated. In such countries there was an absence of competition that acted as a vital spur to endeavour.

There was an increasing tendency for authorities to believe that research could satisfactorily be carried out given adequate bench space, enough money in relation to output, and a number of post-graduate investigators. Such a team would be able to provide many reports and make some progress, but the bulk of work would probably be pedestrian in character. Any organisation contemplating research should go to the greatest

At the Jemeppe works of Solvay et Cie, l. to r., G. L. Semet, general manager for Benelux, G. Jacquemin, manager at Jemeppe, and Dr. P. de Ruytter, works chief engineer



trouble to find the man most interested in the field of work concerned—the man who was enthusiastic and anxious to do the work.

A tendency of recent years had been the way in which universities and research institutes climbed on the 'band-wagon' of whatever line of work was currently popular. How many organisations, asked Sir Eric, had followed the Natta and Ziegler 'band-wagon'. It was, however, true to say that while this particular work represented only a small part of chemistry, it had stimulated research in many diverse fields and had led to many advances.

Discussion

Opening the discussion, Mr. Ernest Solvay, S.C.I. president, spoke of the importance of scientific education. In the normal course of events in Belgium, by the 1970s every brain capable of going to university would be studying there, thanks to the State. Studies would be free of charge and open to everyone and not merely the sons of the rich. Education was particularly important in emerging countries like India—and more important than financial aid for industrial development.

Dr. M. Francis, Scientific Attaché at the British Embassy, Bonn, agreed with Sir Eric that research workers should not be subjected to continual 'prodding'. Given the staff and the backing they would do the job. He instanced how in Germany just after the war, Ziegler was appointed to head the Coal Research Institute, when the Fischer-Tropsch process was developed. Ziegler did not take kindly to being told what he must do and for three years little appeared to be produced. Much work, however, was done on finding out what radicals were and everyone was now familiar with the results of that work. Today much more money was being put

into the institute than the coal producers could afford.

Dr. Francis thought that electronic memory storage equipment could take care of the problem of discoveries made in industry which were not followed up because they were outside the scope of an organisation's field of interest.

Visit to Solvay's Jemeppe Works

A PARTY of some 30 members of the S.C.I. Overseas Section visited the Jemeppe Works of Solvay et Cie on 16 July, while a further party toured the Brussels laboratories of European Research Associates. Before starting their tour of Jemeppe, members were entertained to lunch.

For the major process, the electrolytic production of liquid chlorine, salt is imported by river from Holland. The process utilises Solvay mercury cells, installed in 1948; it was pointed out that an improved version had since been developed. Production of liquid chlorine totals some 120 tons/day.

Solvay use their liquid chlorine to produce at Jemeppe hydrochloric acid, hypochlorite, trichloroethylene, perchloroethylene, chloromethane, chloroform, carbon tetrachloride, and caustic soda. A special unit produces sodium perborate (with borax imported from the U.S.). Calcium carbide is supplied by another Belgian company for the production of acetylene; ethylene is transported by rail from Italy; methane is piped from nearby coal mines.

Hydrogen peroxide is produced by oxidation, under a Solvay process. The product is of 35% concentration, which may be raised to 50%.

One of the largest units on the site is that of the subsidiary, Solvic, producers of p.v.c. A new plant under erection will manufacture corrugated sheet from unplasticised p.v.c.



L. to r., Dr. H. Stach (Esso AG), Mrs. Armstrong, Mr. R. G. Mason (A. Boake, Roberts and Co.), Mrs. Mason, Mr. G. P. Armstrong (Distillers Company)

Promising Properties of New B.C. Polypropylene Sheeting

AN exhibition to illustrate the developments in 'Propylex' a polypropylene sheeting made by British Celanese Ltd., is being held at Celanese House, Hanover Square, W.1, from 20 June to 1 July.

The exhibition marks the recent commencement of commercial production of 'Propylex' by British Celanese, and illustrates a wide range of uses, from football boots with 'Propylex' soles to a fume hood and damper.

Polypropylene is bought as a powder from Shell and is extruded over dies into 'Propylex' sheeting. Present production has been concentrated on natural, black and white sheeting but a certain amount of coloured material has been produced for assessment and, in due course, 'Propylex' will be available in a range of standard colours.

British Celanese believe that there is an excellent prospect for 'Propylex.' It shows resistance to most inorganic acids, alkalis and salts, even in high concentrations and at temperatures of up to 60°C. Very strong oxidising agents, such as 100% oleum or hot 98% sulphuric acid, will, however, appreciably affect 'Propylex.'

Complete resistance is also shown to alcohols, esters, ketones, organic acids and amines. Aromatic hydrocarbons tend to swell 'Propylex' but the material is usually unchanged after the removal of the solvent. The softening point of 'Propylex' is over 150°C enabling it to withstand hot water and ambient temperatures well above the limit of most thermoplastics. This property enables the material to be sterilised and for this reason it is expected to find many uses in hospitals.

'Propylex' appears to have advantages over other plastics of the same type on the market at the moment at the same price. The cost is quoted at approximately 7s per lb. (4s 2d per sq. ft.) in $\frac{1}{4}$ in. natural colour. Other colours cost slightly more.

Although 'Propylex' shows such promise, much development work is still required in fabrication techniques, particularly in vacuum-forming. For this process 'Propylex' requires more heat than polythene or PVC, and softens sharply as its melting point is approached, unlike the more conventional materials which pass through a semi-plastic stage.

New Radioisotopes Bureau Opened

ANOTHER step forward was taken by the U.K. Atomic Energy Authority in furthering their relationship with industry when the new Isotope Information Bureau was opened at the Authority's London office in Charles II Street, last week. As reported in CHEMICAL AGE, 21 May, p. 842, it is the concern of the newly formed Industrial Liaison Group to make industry aware of the many time and money saving uses of radioisotopes. Main function of the bureau will be to provide a convenient point in London where industrialists can make preliminary inquiries about isotopes and their uses in industry.

In opening the Information Bureau, Sir Roger Makins, chairman of the

U.K.A.E.A., said that although it was well known that, in the field of medicine, radioisotopes could materially assist the successful diagnosis and treatment of a great many diseases, it was, perhaps, less well known that, in the industrial field, they contributed to the manufacture of a better product, and simplified many manufacturing processes. In replying, the principal guest speaker, Sir Hugh Beaver, past president of the Federation of British Industries, said that there was a gap between research and getting people to use research and he hoped that the A.E.A. would be able to provide considerable selling service.

Among publications available at the

Bureau is one called 'Isotopes at Work' which is a classified index of industrial uses listed alphabetically under industries. The list of uses in the various chemical industries include: polymerisation by gamma-radiation, cross-linked and graft polymers; mixing efficiency; microanalysis at submicrogram levels; and measuring pipe and tank wall thicknesses for corrosion detection.

Chemical-resistant Effluent Piping by Doulton

A PROBLEM when the new building for Fleetway Publications, London, was being planned, was the provision of effluent piping to resist the wide range of corrosive chemicals used in the photo-gravure process department, including potassium cyanide, acetic, hydrochloric and sulphuric acids, sodium thiosulphate, sodium sulphite, ferric chloride and solvents including xylol.

It was decided to adopt Doulton porcelain fixed flange piping, manufactured from a high strength porcelain material which is completely impervious and for this type of duty is claimed to be preferable to the conventional acid resisting stonewares.

After some trials, a high nitrile synthetic rubber for the jointing gaskets was chosen. Some 80 traps and hoppers were erected on the second floor of the building to carry the effluent through the fixed flange piping.

The effluent was led through three 6 in. mains to the neutralising tanks in the basement of the building. In all some 2,000 ft. of piping was used, incorporating 1,000 joints.

British 'Packaged' Glassware for Greek Laboratories

A £1,200 order to equip the Greek State laboratories with 'packaged unit' laboratory assemblies has been received by Quickfit and Quartz Ltd., Stone (Staffs), manufacturers of interchangeable laboratory glassware. Order comprises some 50 of each of nine basic sets for specific functions. These will be held in a central laboratory at Athens, for issue to laboratories throughout Greece as the occasion arises.

British Glues Chairman Holds Annual Garden Party

More than 100 senior staff of British Glues and Chemicals Ltd., attended the 27th annual garden party given by Mr. Harold J. Cotes, chairman of the group, and Mrs. Cotes, at their Sutton, Surrey, home on June 15.

Chemist Injured in Bradford

An explosion at Valley Road Electricity Power Station, Bradford, on 8 June, caused the station chemist, Mr. Jack Thomas, to be badly burned while working in the water treatment plant. He was taken to St. Luke's Hospital, where he was detained with burns on face and hands. Gases are believed to have caused the explosion.



BRITISH EXHIBITION IN NEW YORK

At the British Exhibition, New York, I. to r., W. H. McFadzean, president, Federation of British Industries, who received a Knighthood in the Birthday Honours, the Duke of Edinburgh and Richard Nixon, Vice-president, U.S. (see 'Distillates')

NEW TAYLOR FIBRE PROCESS GIVES CHEAPER CS₂ FROM PETROLEUM FRACTIONS

EMPLYING liquid petroleum fractions instead of methane as raw material, a new process of carbon disulphide manufacture is claimed to have considerable economic advantages over the methane method currently in favour. From recent evaluation studies it is estimated that the liquid petroleum process will cost about 25% less in plant investment and 15% less in production costs.

The process was developed during the past year by Dr. C. M. Thacker, technical director of Taylor Fibre Co., Norristown, Pa., manufacturers of laminated plastics and vulcanised fibre. Taylor Fibre themselves are not concerned with carbon disulphide manufacture, so the process is being made available for pilot plant development by interested companies.

Details of the process are not revealed, but "it is known that methods for the recovery, separation and purification of carbon disulphide to commercial standards are identical to those used for the proved methane process. Detailed design data must be worked out only for the reactor system." It is also asserted that "although a commercial reactor system remains to be developed, the reaction steps have been demonstrated on a small scale and the uncertainties are therefore not great."

If the new process proves to be all that is claimed, it may well bring about an unexpected turn of events in carbon disulphide manufacture. For the methane process itself—involving the vapour-phase reaction of methane and sulphur in the presence of a silica gel catalyst—is a comparatively recent innovation. It has become increasingly popular in re-

cent years and is the method chosen, for instance, for the big new 52,000 tonnes/year project near Cologne, West Germany, which, as reported in *CHEMICAL AGE*, 13 February, p. 288, is being erected by a new company formed by Glanzstoff Courtaulds G.m.b.H. and Dr. Jacob Chemische Fabrik G.m.b.H. It has also been used very successfully by Stauffer Chemical at their Le Moyne, Alabama, plant, and the company are building a second plant in Delaware. Some other U.S. companies are also using the methane method (see *CHEMICAL AGE*, 6 February, p. 246).

It is claimed that the new liquid petroleum process not only costs less at high production levels but also has economic advantages at lower levels over the methane process or the multiple-retort process. Thus it becomes practical for users of carbon disulphide—principally manufacturers of carbon tetrachloride, rayon and Cellophane—to install small CS₂ plants for captive production.

Data are given, as in the accompanying table, to show that the new process produces a higher yield of CS₂ with less by-products, and requires less handling and heating of sulphur per ton of CS₂ produced. It is also pointed out that, unlike methane, liquid petroleum fractions can be transported economically by a variety of means—pipelines, sea-going tankers, road and rail tankers—thus making it possible to locate plants anywhere within reach of these means of transportation.

Also favourable to the new process is the fact that, in most countries, and in most sections of the U.S., liquid petroleum fractions with low hydrogen-to-

carbon ratios are much cheaper than the natural gases from which methane is obtained. This is particularly true of petroleum liquids containing high concentrations of sulphur. And it is these low-cost fractions which are most suitable for Dr. Thacker's process.

He predicts that carbon disulphide plants using liquid petroleum fractions will be erected where (1) new plants are needed to meet the demand for increased amounts of CS₂ for rayon, Cellophane and carbon tetrachloride production. In the next ten years, production of CS₂ is expected to increase by 200 million lb., requiring an average of 20 million lb. new capacity each year. (2) Old, obsolete charcoal retort plants are replaced. The annual capacity of these plants exceeds 300 million lb. (3) Industrial expansion continues in countries outside of the United States. (4) Low volume production is required, as in captive plants of carbon disulphide users.

He also predicts that although the methane process is comparatively new, with no plant more than 10 years old, these facilities will in time be converted to use fuel oil—particularly where the unit must be altered to increase capacity.

Looking at his process from a worldwide perspective, he believes it is entirely practical to fabricate the equipment in a highly industrialised country such as the United States and ship it for assembly and operation in a less developed country.

A.B.M.A.C. Publish Revised Poisons Rules

The Association of British Manufacturers of Agricultural Chemicals have prepared a booklet which brings up to date the provisions of the Pharmacy and Poisons Act 1933 and the Poisons Rules 1960 relating to the sales of insecticides, fungicides, weedkillers and rodenticides. The booklet, replacing the chart formerly used by the association, is clearly laid out, giving a detailed list of poisons and information as to schedules, labelling, storage, etc., for the purposes of retail and wholesale sales and sales to growers. The booklet may be obtained from the offices of the Association, Cecil Chambers, 86 Strand, London W.C.2, at a cost of 3s.

M.T.D. Queensferry Laboratory Destroyed by Fire

An explosion completely destroyed the laboratory at the factory of Midland Tar Distilleries Ltd., Queensferry, on 12 June. Holidaymakers returning home saw the smoke and flames from the blaze as firemen and five engines fought to control the outbreak in the gathering dusk. The whole course of the fire, from the time of the alarm to the time when the laboratory was reduced to a smouldering wreckage, was less than half an hour. The building contained large quantities of various drugs, and a representative of the company said the loss in actual stocks, equipment and the building, would probably be about £6,000.

Comparison of Methane versus Liquid Petroleum Fractions in the
Manufacture of Carbon Disulphide

BASIS: One pass through Converter				
Methane process	...	...	...	CH ₄ + 4.4S = 0.75CS ₂ + 0.25CH ₄ + 1.5H ₂ S + 1.4S
Fuel oil process:				
Fuel oil	...	...	...	CH _{1.4} + 2.97S = CS ₂ + 0.7H ₂ S + 0.27S
Heavy residuum	...	...	...	CH + 2.75S = CS ₂ + 0.5H ₂ S + 0.25S
(Approximate values)				
PROCESS:				
FEED:		Methane	Petroleum Liquid	
Empirical formula	...	CH ₄	Gas Oil	Heavy Residuum
Feed needs purification before use	...	Yes	CH _{1.4}	CH
Economical transportation other than by pipe line	...	No	Yes	Yes
Assumed conversion per pass	...	75%	100%	100%
SULPHUR (lb./ton CS₂ produced):				
To vaporise and superheat	...	4,940	2,501	2,316
To recycle:				
From sulphur feed	...	1,572	227	211
From H ₂ S oxidation	...	1,684	589	421
Total	...	3,256	816	632
RECOVERY and PURIFICATION				
(After sulphur removal from reacted gases):				
Moles CS ₂ per 100 moles reacted gases	...	30	41	67
Moles gases to condenser per ton CS ₂ produced	...	88	45	39

S.A.C. Organise Joint Meeting in Dounreay

A JOINT MEETING of the Scottish Section, Society for Analytical Chemistry, with the Polarographic Society and the Caithness Technical Society, will be held on Friday, 30 September 1960, in the lecture theatre, Dounreay. The following papers will be presented and discussed:

'Tesla-luminescence in inorganic and organic systems,' by Dr. R. J. Magee (Queen's University, Belfast); 'Applications of polarography in industrial analysis,' by G. F. Reynolds (Chemical Inspectorate, Woolwich Arsenal); and 'The assay of carbon-14 and other low-energy β -emitters,' by Dr. J. C. Bevinton (University of Birmingham).

Those interested in participating in this visit to Dounreay are asked to notify the hon. secretary of the Scottish Section, Mr. J. Brooks, M.A., A.R.I.C., Analytical Research Section, Research and Development Department, I.C.I., Nobel Division, Stevenston, Ayrshire, so that suitable arrangements may be made for transport and accommodation.

Dutch Congress to Discuss Plastics Process Advances

A PROGRAMME has been issued for the International Congress on the Technology of Plastics Processing, to be held in Amsterdam, 17-19 October, under the auspices of three Dutch technological societies: the Bond voor Materialenkennis, Koninklijk Instituut van Ingenieurs, and the Koninklijke Nederlandse Chemische Vereniging. The congress will be held in the Koninklijk Instituut voor de Tropen, Mauritskade 63, Amsterdam.

Morning sessions will include addresses by Dr. J. Overhoff (manager, Koninklijke/Shell Plastics Laboratories, Delft) on 'Material properties v. end product', and by Mr. J. Butler, A.M.I.Mech.E. (British Industrial Plastics Ltd., Birmingham) on 'The challenge to be met by the plastics engineer'. Afternoon lectures will be on: (1) processing techniques and principles of machine design; (2) processing behaviour of specific plastics; and (3) miscellaneous processing techniques—reinforced plastics, foamed plastics, etc.

Further particulars are available from the organisers at: N.V. 't Raedthuys, Tesselshadestraat 5, Amsterdam-W.

Corrosion and Metal Finishing Exhibition and Meeting

The Corrosion Group of the Society of Chemical Industry will be holding a meeting at Olympia, London, on 1 December in connection with the Corrosion and Metal Finishing Exhibition, which is being held from 29 November to 2 December. Subject of the papers to be presented will probably be the influence of water movement on corrosion.

Two of the largest displays at the exhibition will be those of the Atomic Weapons Research Establishment and the Department of Scientific and Industrial Research. Full details can be obtained from the Exhibition Director, 9 Eden Street, London N.W.1.

F.D.A. Charged with Laxity in Approving U.S. Drugs

FOLLOWING the investigation of U.S. tranquilliser prices and advertisements (CHEMICAL AGE, 13 February, p. 278), comes another probe by Senator Kefauver's Senate Subcommittee, this time into the charges of laxity and improper activities in the Food and Drug Administration. The F.D.A. has been charged by Dr. Barbara Moulton, who until her resignation in February had spent five years in the F.D.A. Bureau of Medicine, with being a service bureau for drug manufacturers.

She said that F.D.A. employees were subjected to pressure from drug companies seeking approval of new drugs, that new drugs had been approved despite objections from the medical staff, and that drugs had been approved before all necessary tests had been completed, and even when medical evidence showed they might be unsafe. It was alleged that representatives of drug firms had ready access to F.D.A. chemists, and workers who turned down requests for conferences with industry were reprimanded by their superiors and the appointments made anyway.

The committee was told by Mr. A. S. Flemming, the secretary of Health, Edu-

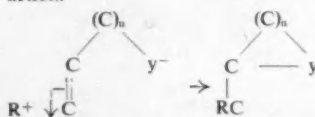
cation and Welfare, that the National Academy of Science would appoint a group of scientists to check the F.D.A. approval of drugs, while a group of doctors and lawyers working within H.E.W. and who had no connection with F.D.A. would investigate the charges of improper administration. Dr. Flemming thinks that this is a matter of a great urgency and assured the committee that the investigation should begin immediately and that a preliminary report should be ready within 60 days.

The question of misleading claims by drug manufacturers is also under consideration. Medical advertising is not subject to F.D.A. jurisdiction but promotional material mailed directly to doctor and druggists is, and Dr. Flemming told the committee that F.D.A. would step up their campaign against misleading statements. In the past F.D.A. has merely asked drug manufacturers to correct such statements and sometimes the suggested changes were not made for some time. In future Dr. Flemming said a time limit would be set after which, if the requests were not complied with, the new drug application would be suspended.

Wisconsin Chemists Study New Means of Producing Carbon-to-carbon Bonds

A NEW means of producing a carbon-to-carbon bond by the alkylation of an isolated double bond with a cation-forming group under neutral conditions has been investigated by two University of Wisconsin chemists, W. S. Johnson and R. A. Bell (*Chemical and Engineering News*, 1960, **38**, 50). This type of reaction is well known when acid catalysis is used, as in the Friedel-Crafts reaction, but Dr. Johnson believes it is unprecedented under neutral or so-called physiological conditions. The reaction involves a nucleophilic agent, such as a carboxylate anion, which intramolecularly assists the reaction of a double bond with a cationic compound such as an active alkyl halide.

The equation shows the general reaction.



The specific reaction studied was that which occurs between the sodium salt of 2,2-diphenyl-4-methyl-4-hydroxyhexanoic acid and benzhydryl chloride. The product, δ -lactone of 2,2,6,6-tetraphenyl-4-methyl-4-hydroxyhexanoic acid was obtained under neutral conditions at room temperature.

The mechanism of the reaction is not definitely established but it may be that

the anion captures a carbonium ion formed in a rate controlling attack of the benzhydryl cation on the double bond.

It is not yet known exactly where this new concept will lead, but Dr. Johnson believes that it should be possible to incorporate both the nucleophilic and cationic groups into the olefinic part of the molecule, hence leading to double cyclisation. It might then be possible to synthesise complex cyclic compounds in this way.

Change of B.A. Policy for 'The Advancement of Science'

Council of the British Association for the Advancement of Science have made a number of changes in the editorial policy and format of their journal, *The Advancement of Science*. In future the journal will reflect progress in the whole field of science since, as the president, Sir George Thomson, says in the foreword to the new edition, the advance of science in the past 50 years has not been matched by an increase in the successful sharing of this advance with non-scientists or even with one another. This policy is in keeping with the efforts of the British Association in the past few years which have been devoted to the diffusion of science. While *The Advancement of Science* will still contain articles of specialised scientific interest, it will be essentially a non-specialist journal.

Overseas News

FLEXIBLE NEW PHTHALIC ANHYDRIDE CATALYST DEVELOPED BY S.D.

A CATALYST enabling phthalic anhydride producers to switch to ortho-xylene as raw material when supplies of naphthalene are short has been introduced by Scientific Design Co. Inc., 2 Park Avenue, New York, N.Y., U.S.A. The company claim that, for the phthalic anhydride producer using a fixed bed process, their new 'universal' catalyst permits the utilisation at high yield of either naphthalene or ortho-xylene, and also mixtures of the two. The company reveal that a plant based on the use of ortho-xylene is already under design in Europe to incorporate this new catalyst in S.D.'s phthalic anhydride process.

Since naphthalene—traditional raw material for phthalic anhydride production—is obtained mainly from coal tar distillation, its availability fluctuates widely with production in the steel industry and the general economy. Ortho-xylene, a petroleum by-product that is also suitable as a phthalic anhydride feedstock, is becoming increasingly available in pure form.

Australian Alkali Plant Increases Output

The I.C.I.A.N.Z. alkali plant at Osborne, South Australia, will soon be producing 160,000 tons/year. The plant was started 20 years ago with a capacity of 50,000 tons/year. This was doubled in 1953. Extensions costing £A1.3 million were embarked on earlier this year (see CHEMICAL AGE, 27 February, p. 365).

Shell Start Commercial Production of Polystyrene

Shell Chemical of the U.S. have started commercial production of polystyrene at a plant leased to them by American Cyanamid, and with the use of Cyanamid's production personnel except in supervisory positions. Present output at Cyanamid's Wallingford, Conn., plant is 35 to 40 million lb. a year of general purpose and high impact polystyrene. The raw materials are being shipped from Shell's styrene monomer plant at Los Angeles.

\$20 Million Rocket Fuel Contract for F.M.C. and Nat. Distillers

Contracts worth \$20 million for the production of multi-million lb. quantities of unsymmetrical dimethylhydrazine have been awarded by the U.S. Air Force to Food Machinery and Chemical Corporation and National Distillers and Chemical. Unsymmetrical dimethylhydrazine is the only high energy synthetic liquid rocket fuel currently being used in large quantities by the Air Force. The production, a joint venture

by the two companies, will be carried out in expanded facilities at Baltimore, Md.

Meanwhile Olin Mathieson are beginning construction on a new plant at Saltville, Va., where they will make anhydrous hydrazine under a contract awarded by the Air Force last month.

Bayer Pharma Build Plant in Colombia

Work is now under way in Colombia on the building there of a new pharmaceutical plant by Bayer de Colombia Ltda. The company, a subsidiary of Farbenfabriken Bayer AG, Leverkusen, is to open the plant by the start of next year. Among other products, it will produce aspirin, antibiotic preparations and sulphonamides.

Parsons to Build Jeddah Oil Refinery

The Ralph A. Parsons construction firm of Los Angeles are to erect the \$40 million oil refinery and oil processing plant at Jeddah to be operated by the Saudi Arabian Refinery Co. The refinery will contain crude and vacuum distillation units, catalytic reformers and an ethyl plant as well as other manufacturing units, and will produce, apart from various oil and petrol grades, butane and propane. The refinery will have a daily throughput of 20,000 bbl, crude oil to come from eastern Arabia, and is planned to come on stream at the end of 1962.

Interhandel May Take General Aniline Case to World Court

Annual report of the Basle financial holding company Interhandel, involved in the legal dispute as to the future ownership of shares in the General Aniline and Film Corporation, states that should the United States Congress permit the sale of General Aniline shares it was possible that Switzerland would bring the case before the International Court of Justice in The Hague. Interhandel claim to have an interest in the chemical and photographic company, which was confiscated by the U.S. Government as enemy property in the last war.

Increased Phosphate Production at N.Z. Farmers' Co-op Plant

New Zealand's new farmer-owned Southland Co-operative Phosphate Co., built for a yearly capacity of 100,000 tons of superphosphate, is well on towards attaining that target in its first year of operation. Bulk supplies of

potash and other fertilisers are being handled through the Southland port and the overall saving to farmers in the province is estimated to be about £40,000/year. Fertiliser requirements were originally supplied by Dunedin and railage from there amounted to about £2 8s/ton.

The works have been planned with an eye to future expansion. Capital cost of the company, including working capital, was £1½ million. So far, Southland producers have contributed £400,000, fully paid up. The remainder has been lent by the New Zealand Meat Board.

E.N.I. Refinery in Tunisia

The State-owned Italian oil concern E.N.I. have come to an agreement with the Government of Tunisia by which they will erect a 1 million tonnes-throughput oil refinery at La Skirra at the end of the Edjeleh pipeline. The refinery, erection of which will start early next year and last two years, will be operated by a company to be owned 50% by E.N.I. and 50% by the Tunisian Government.

Canadian Oxygen and Acetylene Plant on Stream

Production of oxygen and acetylene is now under way at the new \$750,000 plant of Liquid Carbonic Canadian Corporation. The plant is adjacent to Interprovincial Steel Company's mill and is piping oxygen to the mill for use in steel production. The plant will manufacture a complete line of industrial gases for consumption in Saskatchewan.

Sasol Plan to Build Nitrogen Plant

Sasol are to build a nitrogen plant that will be in production towards the end of 1963. At present hundreds of tons of nitrogen are lost to atmosphere each day from the oxygen works at Sasolburg, while hydrogen is available at the company's coal-gasification plant. In addition to ammonia it is planned to produce ammonium nitrate. Choice of plant will depend on examination of the economics involved.

C.I.L. to Raise Capacity of Hydrogen Peroxide

A substantial increase in the capacity of its hydrogen peroxide plant at Hamilton, Ontario, is to be made by Canadian Industries Ltd. C.I.L. say the expansion is necessitated by a continuing increase in the consumption of hydrogen peroxide across Canada, chiefly in the pulp and paper and textile industries.

Mexico to Have 28 New Petrochemical Plants

By 1962 Mexico will have 28 petrochemical plants, it was announced by the director of Petroleos Mexicanos (Pemex). Half these plants are already under construction. Of the 28, 4 will be

for ammonia and derivatives, 6 for benzene aromatics, 3 for synthetic rubber, 2 for plastics, 7 for lead tetraethyl and others for miscellaneous products including sulphur.

The petrochemical industry will be separated from Pemex and run directly by the State, except for 3 plants for synthetic rubber, elementary sodium and tetraethyl. By giving priority to nitrogen products it is hoped to provide the Mexican farmer with cheaper fertilisers.

Sicilian Petrochemical Projects

Celene (company in which Union Carbide and Edison, U.S.A., have 50-50 shares) are building a 16,000 tons/year plant for ethylene oxide production in Sicily. It is scheduled for operation late this year. New plants now in the design stage and scheduled for operation in 1961, will produce a range of olefins.

Celene's low-density polythene plant, close to the coastal road linking Augusta and Siracusa, is now producing transparent sheet for agricultural use. Potential capacity of this plant is about 20,000 tons/year. It utilises ethylene produced by the associated Sincat.

Polycarbonate Resin Plant Starts-up in West Virginia

Polycarbonate resin plant of Mobay Chemical Co. at New Martinsville, West Virginia, is now being started up. Capacity is estimated at about 5 million lb./year and the material will be sold under the trade name Merlon.

New Insecticide and Weedkiller Plant for Monsanto

Monsanto Chemical have started work on their 50% expansion at the Anniston, Ala., plant for the production of parathion and methyl parathion insecticides. Due to be completed in November this year, the project will raise capacity to 18 million lb./year. The company's Nitro, West Virginia, plant has a new unit in production that doubles capacity for weedkillers.

Petrochemical Plans for South Germany

Südpetrol AG für Mineralölwirtschaft, the Munich-based subsidiary of the Italian State oil concern E.N.I., are this year to start the erection of an oil refinery at Ingolstadt, a South German town on the Danube. The refinery will be at the end of an oil pipeline running from Genoa. It is expected that steps will now be taken to set up a petrochemical industry in the Ingolstadt area.

Dominican Republic Furfural Plant Doubles Production

The plant which converts sugar cane bagasse to furfural at the mills of Central Romana, Dominican Republic, has doubled production since it started operation in 1956. In that year 8,829 kilos were produced compared with 17,375 in 1959. In the four years of the plant's operation \$9,172,000 worth of furfural have been sold to Dupont for nylon production.

New 'Package Plant' Phenol Process from S.D.

A new process for the manufacture of phenol has been developed by Scientific Design Co. Inc., New York. Dr. Ralph Landau, S.D. executive vice-president, has stated that the new phenol process was the result of a deliberate research effort to find a new process which featured low capital investment and absence of by-products for sale—one which would be particularly suitable to smaller package plant installation.

In effect, the process makes possible the direct oxidation of benzene to phenol.

Agreement Signed on Israeli Polythene Plant

The Ministry of Commerce and Industry, Israel, has signed an agreement for the setting up of a \$5 million polythene plant with Mr. V. Stark, a U.S. investor. Haifa Refineries are installing a plant for the production of 9,000 tons/year ethylene to supply the polythene unit.

Hercules Powder Textile Merger Planned

A tentative agreement for a merger has been made between the U.S. companies, Hercules Powder and Beaunit Mills. Officials of both firms have confirmed that merger negotiations are in progress but the president of Hercules warned that any number of factors could develop which might result in dropping

the proposed plans. Beaunit make polyester nylon and rayon fibres and plan to make polypropylene fibres next year.

U.S. o-Xylene Plant Due on Stream

The Delhi-Taylor o-xylene plant is shortly to begin production. By July 1 two columns at the Corpus Christi, Tex., refinery are expected to go on stream. If the two columns are used to capacity their output would be 70 million lb./year of 95% o-xylene. Most of the material will go to Japan for use in the production of phthalic anhydride.

Further Canadian Tariff Board Chemicals Hearings

Further to the first two Canadian Tariff Board Hearings on chemicals referred to in CHEMICAL AGE, 18 June, p. 1016, further hearings have now been designated and will be held on 7 November, 2 November, 9 January, 23 January, 6 February, 20 February, and 6 March. Full details are given in the *Board of Trade Journal*, 18 June, p. 7339.

Union Carbide Polythene Plant Puerto Rico

A 110 million lb./year polythene plant is planned by Union Carbide, to be built near Ponce, Puerto Rico, where the company already produces ethylene oxide and ethylene glycol. The polythene produced is intended for world markets, including some to be exported to the U.S. The plant is expected to be in production by the second half of 1962.

Socony Mobil See Wide Usage in Five Years of TML As Antiknock Additive

THE prediction that within five years tetramethyl lead (TML) will be widely used by petroleum refiners as an antiknock additive for petrols has been made by three research workers of Socony Mobil Oil Co. They claim that TML not only possesses an advantage over tetraethyl lead (TEL) for increasing research and motor octane numbers in catalytic reformat blends, but also enables refiners to overcome the problem of road octane depreciation peculiar to the petrols refined by catalytic reforming techniques, and so opens the way to the wider use of these latest and more advanced techniques.

Socony Mobil's first announcement, in January, that they were contemplating the use of TML as an additive has been the subject of previous comment in CHEMICAL AGE (9 January, p. 80 and 23 January, p. 162), and we have pointed out that other leading U.S. oil and chemical companies have also been investigating TML and have filed patents relating to this subject. Now, at the summer meeting of the Society of Automotive Engineers, in Chicago, R. H. Perry, Jr., C. J. DiPerna and D. J. Heath have released the background

story of Socony Mobil's research and development effort. It is stated that the value of the new additive was discovered following extensive work in the company's Paulsboro, New Jersey, research laboratories and road tests carried out by Mobil overseas affiliates.

The authors of the paper pointed out that the platinum catalyst reforming technique has been the most significant recent development in oil refining, but efficient usage of the very high quality gasoline components produced by this process has presented the formidable problem of road octane depreciation. Socony Mobil found that this depreciation could be reduced by (1) increasing the research octane number of the lower boiling fractions, or (2) reducing the fraction of the petrol boiling below 220°F. Practical considerations ruled out the latter method so it was decided that alternative (1) should be followed by increasing the antiknock additive concentration in the fractions with a boiling point up to 220°F. It is claimed that, in all tests carried out with TML, TEL and many intermediate lead alkyls, TML was by far the most effective in reducing road octane number depreciation.

INDIA PLANS BIG DRIVE FOR FERTILISER PLANTS

One Million Tons Planned for 1965-66

DURING the next five to six years India is to build up big new plants to step up fertiliser production. Every State in the country will have at least one major fertiliser factory with an annual capacity of 80,000 tons of nitrogen. Of the target of 1 million tons of nitrogenous fertilisers fixed for 1965-66, government-owned factories being located at Neyveli (Madras), Nangal (Punjab), Rourkela (Orissa), and Trombay (Bombay), along with that at Sindri (Bihar), will take care of 800,000 tons; the balance of 200,000 tons will be made up by private companies.

India's requirement of nitrogenous fertilisers is of the order of 1.5 million tons; current production meets only 40% of this demand, leaving the major portion to be imported. Last year, imports amounted to £12 million.

Annual targets for phosphatic and potassic fertilisers by 1965-66 have been fixed at 500,000 (P_2O_5) and 200,000 (K_2O) tons respectively. The corresponding existing capacities are 182,400 tons and 50,000 tons.

The British firm, Simon-Carves Ltd., are to build a factory at Ennore, near Madras, for East India Distilleries and Sugar Factories Ltd, to produce about 51,000 tons/year of compound fertilisers based on ammonium phosphate. The contract is valued at about £3 million. The factory will include plants for the production of synthetic ammonia, sulphuric acid and phosphoric acid. It is scheduled to come into production in two years.

Bio-gas and Fertilisers

According to an agreement signed in New Delhi between the Government of India and Chemolimpex, the Foreign Trade Company for Chemical Products of Hungary, the latter will help in the setting up of 'bio-gas' and bio-fertiliser producing plants in India by supplying 'know-how' and technical staff. To begin with, two pilot plants will be established, one at the National Sugar Institute, Kanpur (Uttar Pradesh), where sugarcane bagasse will be utilised, and the other at the Indian Agricultural Research Institute, New Delhi. This plant will utilise cow dung and other agricultural wastes.

Based on a project report by a Norwegian expert, the Indian Government has set up a company—the Pyrites and Chemicals Development Co. Ltd.—for the manufacture of sulphur, sulphuric acid and other products from iron pyrites deposits in the Amjor area of Bihar State. The project will have a melting capacity of 200-300 tons/day of sulphur and is estimated to cost £5 million.

Indian requirements of sulphur, estimated at 160,000 tons at present (537,500

tons by 1965-66) are entirely met by imports.

Another step toward self-sufficiency in basic chemicals was taken in India with the going into production of the country's first sodium hyposulphite plant set up by Travancore Cochin Chemicals Ltd. at Udyogmandal, an industrial suburb six miles from Ernakulam (Kerala State). The plant, designed, engineered and erected by Krebs and Co., Switzerland, has a capacity of 3 tons/day and uses the latest amalgam process.

Two more units for producing hyposulphite will go into operation shortly and, together, the three units will meet about 75% of India's current needs (3,000 tons) for her textile, dyeing, printing and sugar industries.

To meet the needs of the country's expanding chemicals and plastics industries, including the proposed 20,000 tons synthetic rubber factory, Government and private entrepreneurs are undertaking projects for expanding the output of industrial alcohol from the present 16.56 million gall. During the next five years the demand is likely to be of the order of 27 million gall./year. An output capacity of about 60 million gall./year by 1965-66 is being planned. The present annual capacity is 35 million gall.

The French company Société Lepage, Urbain et Cie are now constructing and equipping two complete distilleries for the production of denatured and consumer alcohol. One of the distilleries, ordered by the Government of Bombay, will have a capacity of 10,560 U.S. gall. (40,000 litres) per day and will be the largest plant in India for producing industrial alcohol.

A new outlet has been found for lemongrass oil produced in South India, as a source for β -ionone, the starting material in the production of vitamin A. Glaxo Laboratories (India), who are cur-

rently producing β -ionone in their fine chemical factory at Worli (Bombay), are setting up a big plant at Thana (Bombay) for producing enough β -ionone to meet the requirements of their subsidiaries all over the world.

Recent work at the Indian Institute of Technology, Kharagpur (West Bengal), has led to a one-step process for butadiene in which ethanol vapours are passed over suitable catalysts at high temperature. Optimum operating conditions and economics of the process have been developed. A conversion of 72.89% at 425°C has been obtained using a binary system of aluminium and zinc oxides as catalyst in a fluidised bed.

Butadiene is usually prepared by a two-step process of catalytic conversion of alcohol to acetaldehyde and synthesis of butadiene from a mixture of alcohol and acetaldehyde.

A direct process (Indian Patents 62890 and 63083) has been developed at the National Chemical Laboratory, Poona, for preparing 4-hydroxycoumarin, an important intermediate for production of anticoagulant drugs like dicoumarol, trimexan, sodium warfarin or coumadin-sodium, sinthrome, marcoumar, cyclocoumarol, etc. The chemical is also used for preparing warfarin and other materials extensively used as rodenticides.

The new process uses phenol and malonic acid, and is carried out under mild conditions, only simple equipment being required. An alternative two-stage method starting with the same raw materials has also been worked out. Starting with 4-hydroxycoumarin, know-how for the manufacture of the dicoumarol, sodium warfarin and warfarin has also been developed.

The same laboratory has developed a new method for production of hexylresorcinol (Caprokol) (Indian Patent 57888), a well-known urinary antiseptic. The drug is not being manufactured in India and all requirements are met from imports.

The new method does not involve drastic reaction conditions or costly equipment required in the known methods. Starting with 960 g. of caproic acid and 834 g. of resorcinol, the process gave a yield of 1 kg. of hexylresorcinol.

Indian Newsletter . . .

- Fertiliser output will be boosted by setting up major production plants all over the country. Target of nitrogenous fertilisers for 1965-66 is 1 million tons.
- Plants coming into production will meet about three-quarters of India's needs for sodium hyposulphite, thus taking the country another step towards independence in basic chemicals.
- Home production of sulphuric acid and other sulphur products from pyrites is the aim of a new project at Amjor (Bihar).
- A big plant for the production of β -ionone from lemongrass oil is to be set up at Thana (Bombay).
- Short cut to butadiene production? A one-step process for preparing butadiene from alcohol has been developed at the Indian Institute of Technology.
- Another short-cut process—this time developed at the National Chemical Laboratory, Poona, for the preparation of 4-hydroxycoumarin, important drug intermediate.
- Hungarian experts will help Indian technologists to solve the problems of making 'bio-gas' and fertiliser from Indian waste materials.

● **Mr. R. R. Walker** has been appointed to the group board of Aspro-Nicholas Ltd., and from 4 July will also be group staff marketing manager. He was formerly an associate director of Aspro-Nicholas.

● **Mr. J. D. D. Morgan**, of I.C.I.'s General Chemical Division and chairman of the I.C.I. welding panel, and **Dr. L. M. Wyatt**, chief metallurgist with the Central Electricity Generating Board, have been appointed to the research board of the British Welding Research Association.

● **Sir Alexander Fleck, K.B.E., F.R.S.**, is to be president of honour of the symposium on 'Powders in industry: properties and principles of application,' to be held on 29 and 30 September, at the Royal Institution, London. He will also open the symposium which is being organised by the Surface Activity Group, Society of Chemical Industry. There will be 30 papers from British and foreign scientists. Registration form and programme can be obtained from the hon. secretary of the group, S.C.I., 14 Belgrave Square, London S.W.1.

● **Dr. W. E. Harris, B.Sc., Ph.D., F.Inst.F., A.R.I.C.**, assistant area general manager of the No. 6 Area, South-Western Division, N.C.B., for the past five years, has been appointed divisional marketing director. He succeeds **Sir Peter Beauchamp**. Dr. Harris, aged 54, joined the N.C.B. in 1948 as divisional chief scientist at their Tredomen laboratories near Ystrad Mynach.



E. H. Harman (left), of the Yorkshire Tar Corp., who received the O.B.E. in the Birthday Honours, and **R. E. Lewis**, Evans Medical who was awarded the M.B.E.

● **Dr. Harry Hookway, Ph.D., F.R.I.C.**, has been appointed director of the U.K. Scientific Mission in Washington, D.C., and Scientific Attaché at the British Embassy there. He will succeed **Mr. E. S. Hiscocks**, who is returning to Britain in the autumn on completion of a three-year tour of duty to become director of the Tropical Products Institute. Dr. Hookway, who is 38, is assistant director of the National Chemical Laboratory where he has been since joining the Department of Scientific and Industrial Research in 1949. He is well known for his work on polymers, ion-exchange resins and saline water conversion and was the U.K. technical representative on the International Steering Committee for Co-operative Research in Electrodialysis

PEOPLE in the news

from 1953-58. In 1957 he lectured at the National Academy of Sciences Symposium in Washington on saline water conversion and made many contacts with U.S. institutions, universities and firms.

● **Mr. J. G. Sprott** (managing director of Eskimo Foods Ltd.) has been appointed to the board of G. Williams Engineering Co. Ltd., of Willesden and Thetford.

● **Dr. Dorothy Hodgkin, F.R.S.**, university reader in X-ray crystallography, and fellow of Somerville College, Oxford, has been appointed by the Council of the Royal Society as the first holder of the Wolfson Research Professorship, for which the Isaac Wolfson Foundation earlier this year (see *CHEMICAL AGE*, 12 March, p. 459) created a special fund of £200,000. Dr. Hodgkin, who will take up the appointment on 1 October, is to continue her investigations at Oxford of the structure of complex organic molecules by the method of X-ray crystal analysis.

● **Mr. B. R. Corry, A.R.I.C.**, has been transferred from another unit of the Acheson organisation and promoted to works chemist of Acheson Dispersed Pigments Co., Dukinfield, Cheshire. **Mr. T. H. Stothard, F.R.I.C.**, has been appointed works manager. Mr. Stothard's managerial experience in industry has included some years as superintendent of the Plastics Department, British Celanese Ltd. **Mr. K. Harwood** has been promoted to the new position of production supervisor. **Mr. K. Clark**, for several years a senior technical representative with Acheson Colloids Ltd., is wholly engaged on A.D.P. sales development. He operates from the company's London offices.

● **Mr. H. V. Blake** has been appointed commercial manager of Glass Yarns and Deeside Fabrics Ltd., Ingersoll House, 7-9 Kingsway, London W.C.2, a member of the Microcell Group. Previously textile marketing manager of Fibreglass Ltd., he is chairman of the Reinforced Plastics Group of the British Plastics Federation.

● **Mr. A. W. Dunbar Ferns, B.Sc.**, has joined Kestner Evaporator and Engineering Co. Ltd. as technical sales engineer, and succeeds his father, Mr. W. Dunbar

Ferns—whose death was reported in *CHEMICAL AGE*, 11 June, p. 952—as Kestner representative in Scotland. Mr. A. W. Ferns will operate from 73 Novar Drive, Glasgow W2.

● **Mr. F. J. Heath**, general manager of Fisons Horticulture Ltd., has been appointed to the new position of managing director and **Mr. K. J. S. Vasey**, now deputy general manager, is appointed general manager. Mr. Heath, aged 45, joined the Fison Group in July 1955, as manager of the horticultural sales department. He became general manager on the establishment of Fisons



F. J. Heath

Horticulture in July 1959. Mr. K. J. S. Vasey, also 45, joined Fisons in September 1955 and after completing a number of overseas projects he was seconded for a year to Fisons Pest Control (South Africa) Ltd. In April 1957, he returned to the U.K. to become commercial manager of Fisons Pest Control and was transferred to Fisons Horticulture as deputy general manager in April 1959.

● **Mr. Bernard Wright**, of John Thompson Instrument Co. Ltd., who joined the company in June 1958 as their London representative, has been promoted sales manager. He will continue to be based at the London office in Kingsway, W.C.2.

Obituary

We announce with regret the death, on 19 June, of **Mr. John McNay Rimington**, aged 53. Managing director of the Chemical Division of the Distillers Company Ltd. until 1 April, he died in the London Hospital after a long illness. One of the original employees of British Industrial Solvents Ltd., the first large-scale D.C.L. chemical venture, from the time of its formation in 1929, he was thus closely associated with the practical development of D.C.L. in the industrial chemical field from the beginning. Mr. Rimington was appointed B.I.S. company secretary in 1939, to the board in 1945, and to be managing director in 1953. Four years later, on the formation of the Chemical Division, which comprised the industrial alcohol department, B.I.S. and the Carbon Dioxide Co., he was appointed division managing director. He was also on the board of five companies associated with the Chemical Division, and of these he was chairman of three—Orobis Ltd., Hedon Chemicals Ltd., and Honeywill-Atlas Ltd. Mr. Rimington was a popular figure throughout the chemical industry, both in this country and in Europe.

Commercial News

Hardman and Holden

Trading profits of Hardman and Holden Ltd. totalled £311,123 (£255,914) in the year ended 31 March, the highest figure since 1954-55 when they were £349,000. After tax of £90,831 (£70,495) and depreciation of £57,358 (£57,130), net profit was £128,236 (£99,769). A final dividend of 15%, making 20% (17½%) and a one-for-two scrip issue is proposed.

Laporte Industries

Turnover of the Laporte Industries Group increased in 1959-60 and group net profit was £1,808,096 (£1,003,738). Strong demand for the group's products in that year is continuing in the current year, states Mr. P. D. O'Brien, chairman, in his annual statement. The group is reaping the benefit of having foreseen an increased demand for its products and of having laid down units to manufacture them.

Further development of Laporte Titanium is the major project of a number in view; the £3.5 million extension will raise output from 30,000 to 50,000 tons a year (see also p. 1060).

Manchester Oil Refinery

The board of Manchester Oil Refinery (Holdings) is convinced that it is in the best interests of holders that the company should now become a member of the larger Lobitos Oilfields group. Mr. R. E. de Trafford, M.O.R. chairman, states that the company's position as an independent refinery is vulnerable particularly in relation to the scale of operations and to the cost of crude oil. The directors unanimously recommend acceptance of the Lobitos offer. Oh it becoming unconditional, Mr. de Trafford will be invited to join the Lobitos board.

Midland Tar Distillers

Group profits of Midland Tar Distillers for the year ended 31 March were £206,805 (£120,021 for nine months) after tax of £165,551 (£114,112) and depreciation of £278,220 (£183,209). Annual dividend rate is 12½% (7½%, equal to 10%, for previous nine months).

Simon-Carves Ltd.

At meetings of Henry Simon (Holdings) Ltd. and Simon-Carves Ltd. held on 17 June the various resolutions for the merger of the two companies were passed.

At the annual general meeting of Simon-Carves on 17 June, Mr. R. B. Potter, the chairman, referred to a recent Press reference that implied that the G.E.C./S-C Group would incur a loss of over £2 million on the Hunterston nuclear power station contract. Speaking for Simon-Carves only he said that at this stage there was no evidence that substantial losses would, in fact, be incurred. If such had been the case he would have reported the facts to share-

- Laporte Report Continuing Strong Demand
- M.O.R. Directors Recommend Lobitos Bid
- H. Simon-Simon-Carves Merger Plans Passed
- John and E. Sturge Expect Higher Profits

holders. It had the company's policy for the past few years to write off substantial sums each year, which had paid for the research and development expenses it had had to meet on nuclear power plant.

John and E. Sturge

The issue by John and E. Sturge Ltd. of 600,000 5s shares will be made at 11s a share. An interim of 3% has already been paid; a second interim of 3% and a final of 4% are forecast. The directors estimate a pre-tax profit this year of £258,000 (compared with an annual average of £228,000 for 1955 to 1959). Direct exports account for 50% of turnover, while overseas interests in France and Canada are to be further expanded and £250,000 will it is expected be spent in this direction in the next two or three years. The company is still raising U.K. capacity and capital spending this year will total some £270,000.

Yorkshire Dyeware

An increase of just over £70,000 was shown in the profits of Yorkshire Dyeware and Chemical for the year ending 31 March 1960, rising to £233,047. Total distribution is increased by 2½% to 22½% with a final dividend of 15% (10%) and a jubilee bonus of 2½%. It is proposed to increase the authorised capital to £1.3 million and to make a one-for-five ordinary rights issue at 10s 6d per 5s share. The existing issued ordinary is £500,000.

CIBA Ltd.

The first of Clayton Aniline Co.'s new dyestuffs manufacturing units is scheduled to start production in September. This is announced in the annual report of CIBA Ltd., Basle, who are majority shareholders in Clayton Aniline.

Other new ventures in the field of research are also reported. CIBA have succeeded in extracting a fairly large quantity of niobium, while special qualities of tantalum have been developed to meet the demand from the electronics industry.

In 1959, CIBA showed a net profit of £2,271,780, an increase of £245,780 on the previous year. Out of this it has been decided to allot £641,666 to certain welfare and research funds, and to distribute £1.5 million as dividends, the surplus to be carried forward.

Du Pont

Record sales are expected by Du Pont for the second quarter of 1960. This optimism is based on the figures for May which are the highest for any month in the history of the company. The previous record is \$561,586,866 reached a year

ago and this year Du Pont hope to at least equal it, and that the profits will be about the same or a little lower. Taking 1960 as a whole, Du Pont should have a good year and expect to exceed the 1959 record of \$2,114 million. According to the chairman, the reason why profits lag behind sales is the increasing competition in the chemical industry and the trend towards lower prices, especially in nylon.

Mathias Stinnes

Owner of the important German chemical concern Ruhröl, Steinkohlenbergwerk Mathias Stinnes AG, Essen, have declared a dividend of 8% (10%) on founders' shares and 9% (11%) on priority shares for 1959, despite a rise of 18% in Ruhröl turnover. The dividend drop was due to poor results from coal holdings. Ruhröl capacities were fully taken up last year and sales were 10.7% above 1958. Production of synthetic ammonia rose by 13.8% to 54,200 tonnes. Ruhröl plan to develop business in organic chemicals.

Progil S.A.

Progil S.A. of France, report for 1959 a net profit of N.F. 4,180,000 (N.F. 3,030,000) and are to pay a dividend of 7.17% (7.13%) on old capital and some 1.8% on N.F. 10 million new capital. Turnover last year rose 18½% over the 1958 level and exports increased to make up 17.7% of total sales.

Ugine

Ugine (Société d'Electro-Chimie, d'Electro-Metallurgie et des Acieries Electriques d'Ugine) are to pay a net dividend per share of N.F. 4.25 (N.F. 4.10) for the 1959 financial year, in which net profit was N.F. 17,670,000 (N.F. 16,480,000) after depreciation of N.F. 44,740,000 (N.F. 37,060,000). Total turnover rose 10% to N.F. 630 million over 1959 and it is already reported that turnover for the first quarter of the current year is 9% above the same period of 1959. A bright future for the company's turnover is awaited, with the bringing into operation of various new production units.

INCREASES OF CAPITAL

FISONS FERTILIZERS LTD. (formerly Fisons Chemicals Ltd.), Harvest House, Felixstowe. Increased by £16,431,632, in 10s ordinary shares, beyond the registered capital of £3,750,000.

FOUNDRY SERVICES LTD., 285 Long Acre, Nechells, Birmingham 7. Increased by £97,000, in £1 ordinary shares, beyond the registered capital of £3,000.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 27 July

Substituted organic phosphine derivatives. Albright & Wilson (Mfg.) Ltd. **842 593**
Epoxy resin compositions. Minnesota Mining & Manufacturing Co. **842 867**
Process for the manufacture of insoluble ion-exchange synthetic resins. Farbenfabrik Wolfen Veb. **842 714**
Stabilisation of olefinic polymers. Monsanto Chemical Co. **842 872**
Process for the treatment of polyethylene. Sequoia Process Corp. **842 873**
Derivatives of 4:5:6:7:10:10-hexachloro-4:7-endomethylene-4:7:8:9-tetrahydrophthalane. Ruhrchemie AG. **842 319**
Partially saponified reaction products of rosin and an α - β ethylenically unsaturated diabasic aliphatic acid or anhydride. Hercules Powder Co. **842 885**
Hydrocarbon conversion process. California Research Corp. **842 723**
Methods of producing diketodicarboxylic acid esters when prepared by said methods. Spofa, Spojene Farmaceuticke Zavody Narodni Podnik. **842 725**
Tannic acid salt of 1-p-chloro-benzyl-2-pyrrolyldimethyl-benzimidazole and medicinal preparations containing same. Schering AG. **842 729**
Process for the manufacture of vinyl ethers. Wacker-Chemie GmbH. **842 731**
Manufacture of halogen-containing polyolefins. Farbwerke Hoechst AG. **842 416**
Process for the production of compounds containing at least one isocyanuric acid ring. Farbenfabriken Bayer AG. **842 420**
Organic compounds of tin and a process for their manufacture. Farbwerke Hoechst AG. **842 639**
Curing of interpolymerisable mixture. Pittsburgh Plate Glass Co. [Addition to 768 957.] **842 980**
Process for the preparation of perhydrate compounds containing water of crystallisation. Henkel & Cie GmbH. **842 263**
Process for the production of polymerisable polyesters and mixtures of these polyesters with polymerisable monomeric vinyl compounds. Farbenfabriken Bayer AG. **842 264**
Acetylene compounds and process of preparing same. Lakeside Laboratories Inc. **842 651**
Process for the production of phenazine derivatives. Geigy AG., J. R. **842 652**
17- β -Hydroxyl-17-alkynyl steroids and their preparation. British Drug Houses Ltd. **842 678**
Manufacture of cellular polymeric materials. Imperial Chemical Industries Ltd. **842 734**
Process for the production of solid urethane polyisocyanate-urea diisocyanate mixtures and mixtures produced by this process. Farbenfabriken Bayer AG. **842 338**
Process for the production of cross-linked plastics of high molecular weight. Farbenfabriken Bayer AG. **842 339**
Steroid compounds. Laboratoires Francais de Chimiotherapie. **842 922**
Manufacture of polyethylene structure and coatings. Du Pont de Nemours & Co., E. I. **842 556**
Chemical modification of isolefin-multi-olefin copolymers. Esso Research & Engineering Co. **842 557**
Boron oxygen compounds and their preparation. Olin Mathieson Chemical Corp. **842 558**
Manufacture of sulphuric acid. Laporte Acids Ltd. **842 467**
Process for the production of polyamides. Farbenfabriken Bayer AG. **842 576**

Process for the stabilisation of compounds containing dihalogeno-3-triazine groups, and the compositions so obtained. Imperial Chemical Industries Ltd. **842 933**
Age-resisters for plastics containing urethane groups. Farbenfabriken Bayer AG. **842 271**
Steroid compounds and their preparation. British Drug Houses Ltd. [Addition to 842 678.] **842 659**
Process for obtaining glycols from dilute sugar solution. Inventa AG. **842 743**
Production of potassium manganates. Carus Chemical Co. **842 745**
Polymeric materials. Imperial Chemical Industries Ltd. **842 663**
Polystyrene production. Standard Oil Co. **842 665**
Triazine derivatives. Geigy AG., J. R. **842 666**
Polycarbonates and a process for the production thereof. Farbenfabriken Bayer AG. **842 759**
Unsaturated alkyl moulding compositions and moulded products therefrom. Allied Chemical Corp. formerly Allied Chemical and Dye Corp. **842 760**
Conjoint halogenation technique for polyolefins. Dow Chemical Co. **842 763**
Isolation of tetracycline and/or chlorotetracycline from a fermentation broth. American Cyanamid Co. **842 582**
Glycols. Geigy AG., J. R. **842 275**
Leather-substitutes and their production. Du Pont de Nemours & Co., E. I. **842 492**
Acylated sulphapyridazines. American Cyanamid Co. **842 494**
Production of cumene hydroperoxide. Distillers Co. Ltd. **842 586**
Polyester film-forming process. Du Pont de Nemours & Co., E. I. **842 777**
Process for the catalysed abnormal addition of hydrogen sulphide to unsaturated compounds. Dow Chemical Co. **842 277**
Modified polyacetals. Quaker Chemical Products Corp. **842 279**
Process for the purification of crude cyanuric chloride by sublimation. Lonza Electric & Chemical Works Ltd. **842 781**
Catalytic hydrofining and/or hydrogenation of hydrocarbons. Institut Francais du Petrole, des Carburants et Lubrifiants. **842 377**
Polycyclic lactones and a process for the preparation thereof. Laboratoires Francais de Chimiotherapie. **842 944**
Hydrophilic interpolymers of polymerisable ethylenically unsaturated compounds and sulpho esters of α -methylene carboxylic acids. Dow Chemical Co. **842 563**
Production of boron trifluoride. Wilkinson & Son Ltd., J. **842 515**
Catalysis of phosphosulphurisation reactions. Esso Research & Engineering Co. **842 793**
Process for the production of polymer dispersions which are stable to frost and electrolytes. Badische Anilin- & Soda-Fabrik AG. **842 672**
Organic compounds. Imperial Chemical Industries Ltd. **842 673**
Alkoxy-methylenenitroacetates. Imperial Chemical Industries Ltd. **842 797**
Process for the manufacture of acetaldehyde, catalysts for use therein and processes for their preparation and regeneration of such catalysts. British Oxygen Research & Development Ltd. **842 798**
Organosilicon compounds. Midland Silicones Ltd. **842 674**
Process for the manufacture of polyamides which are delustered or which contain pigments. Vereinigte Glanzstoff-Fabriken AG. **842 675**
17- β -Hydroxy-17, α -alkynyl steroids + the 19-novandrostane class and method for their preparation. British Drug Houses Ltd. **842 676**
Water-soluble azo or anthraquinone dyestuffs containing methylol groups, a process for their production, and dyes obtained therewith. Badische Anilin- & Soda-Fabrik AG. **842 802**
Preparation of substituted piperazines. American Cyanamid Co. **842 804**
Process for producing L-glutamic acid. International Minerals & Chemical Corp. **842 679**
Potash ore treatment. International Minerals & Chemical Corp. **842 682**
Process for preparation of isoscorbic acid. Miles Laboratories Inc. **842 523**

Process and apparatus for carrying out mass polymerisation. Manufactures des Glaces et Produits Chimiques de Saint-Gobain, Chauny & Cirey S.A. des. [Addition to 749 086.] **842 690**

2-Piperidylphenyl methanol ethers. Soc. des Usines Chimiques Rhone-Poulenc. **842 671**
Production of α -vinyl ketones. Soc. des Usines Chimiques Rhone-Poulenc. **842 529**
Process for the polymerisation of olefin oxides with ferric compounds. Abbey, A. (Dow Chemical Co.). **842 427**
Process for preparing 2-methyl-2-n-propyl-1,3-propanediol dicarbamate. Simes, SpA. **842 816**
Process for the production of a reaction product of calcium carbide. Farbenfabriken Bayer AG. **842 305**
Production of silane. Du Pont de Nemours & Co., E. I. **842 825**
Thio-phosphonic acid esters. Farbenfabriken AG. **842 306**
Quaternary amide-zinc pentochlorophenolate salts. Chemische Werke Witten GmbH. **842 829**
Resolution of DL-tryptophan. Du Pont de Nemours & Co., E. I. **842 839**
Process for the polymerisation of unsaturated compounds. Farbenfabriken Bayer AG. [Addition to 820 675.] **842 341**
Gamma-aminobutyl choline chloride hydrochlorides and process for their production. Daichi Seiyaku Co. Ltd. **842 843**
Method of preparing alkyl borate esters. United States Borax & Chemical Corp. **842 534**
Manufacture of acetylene and chlorinated hydrocarbons. Wacker-Chemie GmbH. **842 539**
Process for the preparation of halogenated 3-keto-steroids. Organon Laboratories Ltd. **842 343**
Polymerisation process. Solvic SA. **842 846**
Preparation of an improved dehydrogenation catalyst and a dehydrogenation process using the improved catalyst. Bataafsche Petroleum Maatschappij N.V., De. **842 848**
Process for the production of polyester films. Du Pont de Nemours & Co., E. I. [Divided out of and addition to 842 777.] **842 778**
1 - Bromo-4:5:6:7:10:10-hexachloro-4:7-endomethylene-4:7:8:9-tetrahydrophthalane. Ruhrchemie AG. [Divided out of 824 319.] **842 320**

Open to public inspection 4 August

Electrolytic cells reclaiming uranium from solutions. Boyer, R. Q. **843 482**
Separation of plutonium. Kamack, H. J., and Balthis, J. H. **843 481**
Uranium-vanadium recovery process. U.K. Atomic Energy Authority. **843 092**
Pregnadienes. Schering Corp. **843 211**
Production of chlorides of metals. U.K. Atomic Energy Authority. **843 261**
Process for the hydrogenation of catalytic reformates. British Petroleum Co. Ltd., Cuddington, K. S., and Mather, J. **843 177**
Amines and processes for their preparation. May & Baker Ltd. [Addition to 770 870.] **843 264**
Polymers and photographic emulsions containing them. Kodak Ltd. **843 501**
Process for the preparation of cyclopentanophenanthrene derivatives. Syntex S.A. **843 108**
Manufacture of naphthalene. Sharples Centrifuges Ltd. **843 111**
Process for the production of trialkyl benzenes. Mid-Century Corporation. **843 601**
Manufacture of nitrofurans derivatives. Norwich Pharmacal Co. **843 602**
Processes for the manufacture of terephthalic acid. Schemuth, W. **843 180**
Acid of the reserpine series, its monoesters and salts thereof, and a process for their manufacture. Ciba Ltd. **843 451**
Process for the oxidation of aromatic hydrocarbons. Mid-Century Corporation. **843 181**
Halogenated diphenylethanols. Rohm & Haas Co. **843 603**
Apparatus for slaking lime. Atlas-Werke AG. **842 987**
Methods of treating titanium ores. Pechiney Compagnie De Produits Chimiques Et Electro-metallurgiques. **843 493**
Therapeutic bis-quaternary compounds. Irwin, Neisler & Co. **842 995**
Process for the production of carboxylic acids by the oxidation of organic compounds. Imperial Chemical Industries Ltd. **842 998**
Process for the separation of iron, aluminium and titanium values from materials containing them. Strategic-Udy Metallurgical & Chemical Processes Ltd. **843 607**
Alkylene or cyclo-alkylene diamine diacetic acids, their heavy metal complexes and their use. Geigy, AG., J. R. **843 003**

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. D/d in ret. barrels (tech. acid barrels free); in glass carboys, £8; demijohns, £12 extra. 80% tech., 10 tons, £97; 80% pure, 10 tons, £103; commercial glacial, 10 tons, £106.

Acetic Anhydride. Ton lots d/d, £128.

Alum. Ground, f.o.r., about £25.

MANCHESTER: Ground, £25.

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.

MANCHESTER: £16 to £18.

Ammonia, Anhydrous. Per lb., 1s 9d-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £33 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £37 10s.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. MAP., £106 per ton; DAP, £100 10s., per ton, d/d.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s 6d d/d to 6s; golden, 3s 9d d/d per lb. to 5s 2d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 5-ton lots or more, bag packing, £41 per ton.

Barium Chloride. 2-ton lots, £45.

Barium Sulphate (Dry Blanc Fixe). Precip. 2-ton lots, d/d, £39.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

Borax. Ton lots, in hessian sacks, c.p. Tech. anhydrous, £70; gran., £47; crystal, £50 10s; powder, £51 10s; extra fine powder, £52 10s; BP, gran., £56; crystal, £59 10s; powder, £60 10s; extra fine powder, £61 10s. Most grades in 6-ply paper bags, £1 less.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78; crystal, £87; powder, £84 10s; extra fine powder, £86 10s; BP gran., £91; crystal, £99; powder, £96 10s; extra fine powder, £98 10s. Most grades in 6-ply paper bags, £1 less.

Calcium Chloride. Ton lots, in non-ret. pack; solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

Chromic Acid. Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2½d.

Chromium Sulphate, Basic. Crystals, d/d, per lb., 8½d; per ton, £79 6s 8d.

Citric Acid. In kegs, 1-4 cwt. lots, per cwt., £11; 5-19 cwt. lots, per cwt., £10 16s; 1 ton lots, per cwt, £10 15s; packed in paper bags, 1-4 cwt. lots, per cwt., £10 12s; 5-19 cwt. lots, per cwt., £10 8s; 1 ton lots, per cwt., £10 7s.

Cobalt Oxide. Black, per lb., d/d, bulk quantities, 13s 2d.

Copper Carbonate. Per lb., 2s 1d.

Copper Sulphate. £85 per ton less 2% f.o.b. Liverpool.

Cream of Tartar. 100%, per cwt., about £11 12s.

Formaldehyde. In casks, d/d, £40.

Formic Acid. 85%, in 4-ton lots, c.p., £91.

Glycerine. Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £12 1s 6d. Refined technical grade industrial, 5s per cwt. less than chem. pure.

Hydrochloric Acid. Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

Hydrofluoric Acid. 60%, per lb., about 1s 2d.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £115; 35% wt., d/d, £138.

Iodine. Resublimed BP, under 1 cwt., per lb., 11s; for 1-cwt. lots, per lb., 10s 6d.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc. Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Iodoform. Under 1 cwt., per lb., £1 2s 4d for 1-cwt. lots, per lb., £1 1s 8d, 5 cwt., per lb., 21s 1d, crystals, 3s more.

Lactic Acid. C.P., 44% by wt., per lb., 14d; 50% by wt., 15½d; 80% by wt., 25½d; dark tech., 44% by wt., per lb., 9d; 1-ton lots, ex-works, usual container terms.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Basic prices: 15-cwt. drum lots, Genuine dry red, £107 per ton; orange lead, £119 per ton; Ground in oil: red, £127 10s, orange, £139 10s.

Lead, White. Basic prices: in 5-cwt. drums, per ton for 2 ton lots, Dry English £119 5s; Ground in oil, £138 5s.

Lime Acetate. Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

Litharge. In 5-cwt. drum lots, £119 per ton.

Magnesite. Calcined, in bags, ex-works, about £21.

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £17 10s.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £16.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, £1 0s 3d; 5-cwt. lots, in 28-lb. parcels, £1 0s 9d; 1-cwt. lots, £1 1s.

Mercury Sulphide, Red. 5-cwt. lots in 28-lb. parcels, per lb., £1 10s 6d; 1-cwt. lots, £1 11s.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35 2s.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 56 lb. paper bags, c.p., about £125-£130.

Phosphoric Acid. TPA 1,700, ton lots, c.p., £103; BP (s.g. 1.750), ton lots, c.p., per lb., 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £76.

Potassium Chloride. Industrial, 96%, 1-ton lots, about £24.

Potassium Dichromate. Gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2½d.

Potassium Iodide. BP, under 1-cwt., per lb., 7s 2d; per lb. for 1-cwt. lots, 6s 11d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11½d; 3-cwt. lots, per lb., 1s 11½d; 5-cwt. lots, per lb., 1s 10½d; 1-ton lots, per lb., 1s 10½d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. drums, c.p. station, in 4-ton lots, about £80 per ton.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1½d. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 10s; 56 lb. and over, 9s 9d.

Sodium Metaphosphate [Calgon]. Flaked, paper sacks, £136.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: disodium, crystalline, £40 10s, anhydrous, £89; tri-sodium, crystalline, £39 10s, anhydrous, £87.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches., 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [Desiccated Glauber's Salt]. D/d in bags, about £19.

Sodium Sulphate [Glauber's Salt]. D/d, up to £14.

Sodium Sulphate [Salt Cake]. Unground, d/d station in bulk, £10.

MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £9 15s. per ton. £11 7s 6d; 140° Tw., arsenic free, £8 2s 6d; 140° Tw., arsenious, £7 17s 6d.

Tartaric Acid. Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £110; green seal, £108; red seal, £105.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £124; in 10-gal. drums, £114; in 40-45 gal. drums, under 1 ton, £89; 1-5 tons, £84; 5-10 tons, £82; 10 tons and up, £80; in 500-gal. tank wagons, £79. In bulk minimum 2,500 gal. £75 per ton.

Butyl Acetate BSS. 10-ton lots, £165.

n-Butyl Alcohol BSS. 10 tons, in drums, d/d, £137 10s.

sec-Butyl Alcohol. All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45

gal. drums, under 1 ton, £133; 1-5 tons £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

tert-Butyl Alcohol. 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £203; 45-gal. 1-4 drums, £209.

Diethyl Phthalate. In drums, 10 tons, per ton, £187 10s; 45-gal. 1-4 drums, £193 10s.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £179; 45-gal. 1-4 drums, £185.

Diocetyl Phthalate. In drums, 10 tons, d/d, per ton, £276; 45-gal. 1-4 drums, £282.

Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.

Ethyl Acetate. 10-ton lots, d/d, £137.

Ethyl Alcohol Fermentation grade (PBF 66 o.p.). Over 300,000 p. gal., 3s 10½d; d/d in tankers, 2,500-10,000 p. gal. per p. gal., 4s 0½d. D/d in 40/45-gal. drums, p.p.g. extra, 2d.

Absolute alcohol (74.5 o.p.), p.p.g. extra, 2d.

Methanol. Pure synthetic, d/d, £40.

Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 7½d; 100-499 gal. in drums, d/d per gal., 6s 0½d-6s 2½d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 5s 11d; 100-499 gal. in drums, d/d, per gal., 6s 4d-6s 6d.

Methyl Ethyl Ketone. All d/d in 40/45-gal. drums, under 1 ton, £143 10s; 1-5 tons, £138 10s; 5-10 tons, £136 10s; 10 tons and up, £143; in 400-gal. tank wagons, £134 10s.

Methyl isoButyl Carbinol. All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

Methyl isoButyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

isoPropyl Acetate. 10 tons, d/d, 45-gal. drums £132.

isoPropyl Alcohol. Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45-gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.

Carbon Black. GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 6½d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7½d per lb.; ex-store, Manchester, London and Glasgow, 7½d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 8d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8½d per lb. Ex-store Manchester, London and Glasgow, 9d per lb.

Carbon Tetrachloride. Ton lots, £83 15s.

India-Rubber Substitutes. White, per lb., 1s 4½d to 1s 7d; dark, d/d, per lb., 1s 0½d to 1s 4d.

Lithopone. 30%, about £57 10s for 5-ton lots.

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

Vegetable Lamp Black. 2-ton lots, £64 8s.

Vermillion. Pale or deep, 7-lb. lots, per lb., 15s 6d.

COAL TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

Carbolic Acid. Crystals, min. price, d/d bulk, per lb., 1s 4½d; 40/50-gal. ret. drums extra, per lb., ½d.

MANCHESTER: Crystals, d/d, per lb., 1s 4½d-1s 7d; crude, naked, at works, 8s 5d.

Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d.

MANCHESTER: Per gal., 1s 3d-1s 8d.

Cresylic Acid. Pale 99/100%, per gal., 12s. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

Naphtha. Solvent, 90/160°, per gal., 5s 3d. heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 3s 11d. Drums extra; higher prices for smaller lots.

Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £22-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

Pitch. Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

Pyridine. 90/160, per gal., 16s 6d about.

Toluol. Pure, per gal., 5s 9d; 90's, d/d, 2,000 gal. in bulk, per gal., 5s 1d.

MANCHESTER: Pure, naked, per gal., 5s 6d.

Xylole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 8½d-5s 10½d.

INTERMEDIATES AND DYES (Prices Normal)

m-Cresol 98/100%, 10 cwt. lots d/d, per lb., 4s 9d.

o-Cresol 30/31°C. D/d, per lb., 1s.

p-Cresol 34/35°C. 10 cwt. lots d/d, per lb., 5s.

Dichloraniline. Per lb., 4s 6d.

Dinitrobenzene. 88/99°C., per lb., 2s 1d.

Dinitrotoluene. Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

p-Nitraniline. Per lb., 5s 1d.

Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 10d.

Nitroanthralene. Per lb., 2s 5½d.

o-Toluidine. 8-10 cwt. drums (drums extra), per lb., 1s 11d.

p-Toluidine. In casks, per lb., 6s 1d.

Dimethylaniline. Drums extra, c.p., per lb., 3s 2d.

Market Reports

New Demand Reported with Prices Steady

LONDON A good movement against contracts and a steady flow of additional home trade business has been reported on the industrial chemicals market. Prices on the whole are steady with quotations moving within narrow limits.

Demand for agricultural chemicals is reasonably good, and there has been a fair buying interest in the coal tar products market with no changes to record.

MANCHESTER On the Manchester market for chemical products fresh enquiry and actual business, as well as contract movements of supplies, has been seasonally affected by holiday stoppages and this factor will make itself increasingly felt during the coming weeks. Otherwise, demand for a wide range of both light and heavy chemicals has been on reasonably steady lines, with stable prices. There is a steady call for most of the tar products.

SCOTLAND The volume of business during the past week has been upheld and demands have again been varied and covered a fairly wide range of industrial chemicals. Although buying generally has been against immediate requirements there has been a fair proportion of forward bookings placed. There is little change to report in regard to agricultural chemicals with demands for seasonal requirements still very active.

Prices have not shown much alteration and on the whole remained steady. Position of the export market is still satisfactory with a steady flow of enquiries.

Will

Mr. Victor Blagden, founder and former chairman of Victor Blagden and Co. Ltd., a former director of Burt, Boulton and Haywood Ltd., and first chairman of the British Chemical and Dyestuffs Traders' Association, who died on 31 March, aged 92 years, left £211,280 net (duty paid £123,215).

New Technique for Silicone Proofing

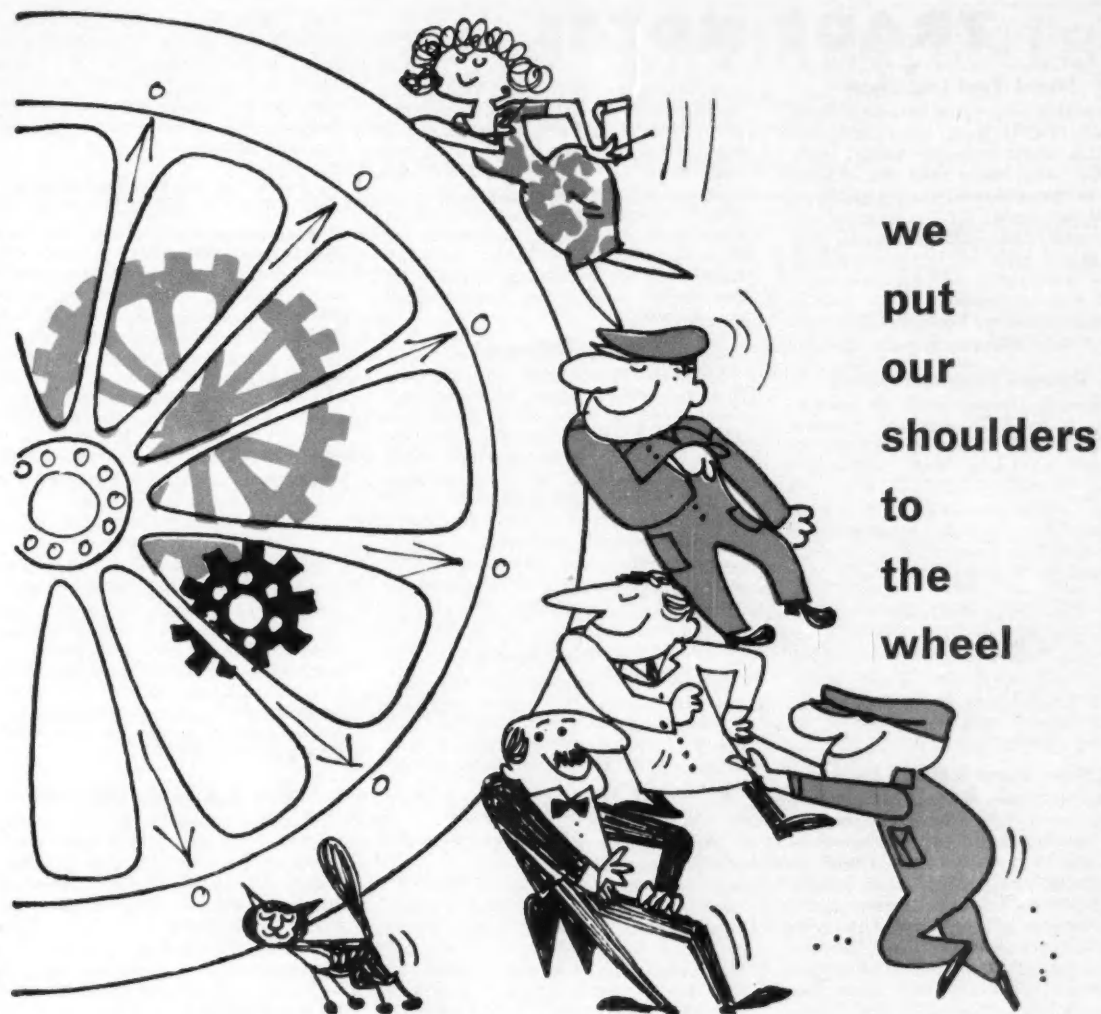
A SILICONE emulsion, EP277, is used in a new technique for applying silicone proofing to textiles, which has been evolved by the Nobel Division of I.C.I. The new technique is claimed to offer the textile industry "outstanding advantages and economy with equipment." Used with the new silicone emulsion are two catalysts, EP298 (an experimental product developed by Nobel Division) and aluminium formate grade 'S' (made by Nobel Division).

The emulsion has been specially formulated for application to wools, to all fabrics containing wool as a major constituent, and to pure synthetics, by an

exhaustion technique from a winch or washer. Specialised equipment, previously necessary for processing, is not needed with the new method.

It is claimed that after treatment of fabrics the silicone will cure at a lower temperature than has hitherto been possible, and that the degree of water-repellency imparted, as measured by the Bundesmann test, is excellent, with low absorption and zero penetration for most fabrics.

Further details are available from Imperial Chemical Industries Ltd., Silicones Department, Stevenston, Ayrshire.



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TRADE NOTES

Monel Tool Distributor

Optoshield Ltd., 146 Clerkenwell Road, London E.C.1, have been appointed sole U.K. distributors for Ampco spark-resistant tools. More than 400 different tools in Ampco metal, beryllium-copper or Monel metal, are included in the range, and stocks are available in London. Monel tools are recommended for use in the presence of chemicals which attack high copper-base alloys, such as acetylene and other liquid gases used for cutting and welding.

Bisomel Hexylene Glycol

A specially refined grade of hexylene glycol is available for the cosmetic trade from the Chemical Division, the Distillers Company Ltd., Devonshire House, Piccadilly, London W.1. The material will be known as Bisomel grade hexylene glycol and should not be confused with Bisol hexylene glycol, a grade produced for industrial purposes.

I.C.I. Fortafil

The new booklet on Fortafil A70, an amorphous, hydrated sodium aluminium silicate, referred to in 'Trade Notes,' 7 May, p. 774, is a product of the I.C.I. Alkali Division and not the Metals Division as stated.

Esso Butyl Rubber Data

Various aspects of butyl rubber technology are discussed in four new technical information sheets published by Esso Petroleum Co. Ltd., Chemicals Department, 50 Stratton Street, London W.1. TIS29 deals with the nuclear radiation resistance of butyl rubber, and the effect of compounding, and includes tabulated data on the effects of Cobalt 60 gamma radiation. TIS30 deals with butyl as a lining material for metal tanks and reveals that a feasible approach to

fabrication of satisfactory lined tanks has now been worked out in the laboratory: hitherto the fabrication of butyl tank linings has been hampered by the occurrence of splice porosity and blistering between liner and tank. The other two publications are TIS31, which deals with butyl soling compound for the shoe industry, and TIS32, discussing butyl insulation compounds obtained by the use of sulphur and sulphur-donor cure systems.

Spray Diffusers

Standard publications are available from the London agents of Firma Paul Lechler, Ascog Ltd., Ascog House, 44 Theobalds Road, W.C.1, describing the range of Lechler spray nozzles for use in various industries. The agents will also be glad to send questionnaires to enable engineers and those engaged in the design of schemes to send sufficient details for their problems on dust laying, vapour and gas cooling, fine atomisation, air-moistening and cleaning, etc., to be solved.

Industrial Bowls

Precision Components (Barnet) Ltd., who have recently moved to Kabi Works, Cranborne Road, Potters Bar, have produced a new brochure for their range of industrial polythene bowls, buckets, bins, etc.

Murgatroyd Chemicals

The specifications and notes on the manufacture of the Murgatroyd's Salt and Chemical Co. Ltd range of chemicals are given in a new booklet called 'Product Specifications'. Murgatroyd's, now owned jointly by the Distillers Co. Ltd. and Fisons Ltd., produce caustic soda by both the Hooker diaphragm cells and also by mercury cells of recent German design—the first to be installed in the

U.K.—which produce high quality rayon grade caustic soda. The booklet is illustrated with photographs of various stages of the manufacture of caustic soda, liquid chlorine, salt, sodium hypochlorite, hydrochloric acid and compressed hydrogen.

Price Cut for Fluoroelastomer

Reduction in the price of Viton B fluoroelastomer from 114s/lb. to 99s/lb. delivered has been made by the Du Pont Co. (United Kingdom) Ltd. The company states that the reduction results from "steadily increasing sales since its commercial introduction in the U.K. last year." This new reduction means the price for all three types of Viton sold in the U.K.—the other two are Viton A and Viton A-HV—are the same. The 'Vitons,' developed by Du Pont in the United States, are intended for industrial applications calling for outstanding resistance to both heat and fluids.

New I.C.I. Silicone Grease

Silicone grease M494 has been added to the products of I.C.I. Nobel Division, Silicones Department, Stevenston, Ayrshire. It is claimed that outstanding electrical qualities, coupled with the silicone characteristic of intense water-repellency, give it exceptional efficiency as a sealing agent for electrical equipment, and as a general agent to protect surfaces against moisture.

Wax Polish Formulations

Recipes for liquid and paste polishes for cars, as well as for an abrasive polish of the emulsifier type and for a white shoe polish, are given in wax technical service bulletin No. 68 from Bush Beach and Segner Bayley Ltd., Marlow House, Lloyd's Avenue, London E.C.3. Also discussed is the new idea of introducing certain synthetic resins into paste polish formulations in the form of solutions in white spirit.

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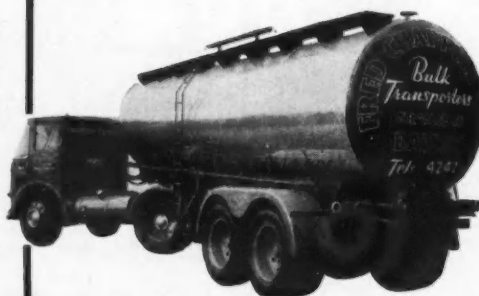
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invites Tenders for the supply of the Equipment as listed below, for the manufacture of Streptomycin by Hindustan Antibiotics Ltd., India.

Indentor's Indent No.	Tender Enq. No.	Brief description of equipment required	Closing date	Price per tender s. d.
PUR:ISM/STR/65	SE-196	Equipment-Vacuum Tumbler Dryer with accessories	August 11th, 1960	14 4
"	/66 SE-197	Filtration Unit com- prising of sheets fitter, centrifugal pump and electric motor	August 18th, 1960	7 2
"	/67 SE-198	Automatic Sealing Machine	August 11th, 1960	14 4

Specifications, etc., relative to the above specifications can be obtained from the Co-ordination Branch, India Store Department, Bromyard Avenue, Acton, London, W.3. The cost of tender sets are as indicated above and are not refundable.

Tenders are to be returned direct to India Supply Mission, 2536 Massachusetts Avenue, N.W., Washington, 8 D.C., United States of America, and not to this office, and are to reach them on the dates specified above against each inquiry number.

Specimen copies of the above inquiries can be seen at Engineering Branch, India Store Department, Government Buildings, Bromyard Avenue, Acton, London, W.3, under the following reference: S.3106/60/NSC/ENG.2.

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Application Forms from Director of Recruitment, Colonial Office, London, S.W.1. (quoting BCD 63/8/020).

PATENTS & TRADE MARKS

KINGS PATENT AGENCY, LTD. (B. T. King, A.I.Mech.E., Patent Agent), 146a Queen Victoria Street, London, E.C.4. City 6161. Booklet on request.

The Proprietors of Patent No. 766494 for "PROCESS FOR THE SEPARATION OF GASEOUS HYDROCARBON MIXTURES INTO INDIVIDUAL CONSTITUENTS OR FRACTIONS THEREOF" desire to secure commercial exploitation by Licence or otherwise in the United Kingdom. Replies to Haseltine Lake & Co., 28, Southampton Buildings, Chancery Lane, London, W.C.2.

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The Company is situated near the Chilterns yet only 20 miles on direct route to London.

Please apply in writing giving details of age, education and experience to: **The Personnel Officer, A. WANDER LIMITED, Ovaltine Works, Kings Langley, Herts.**

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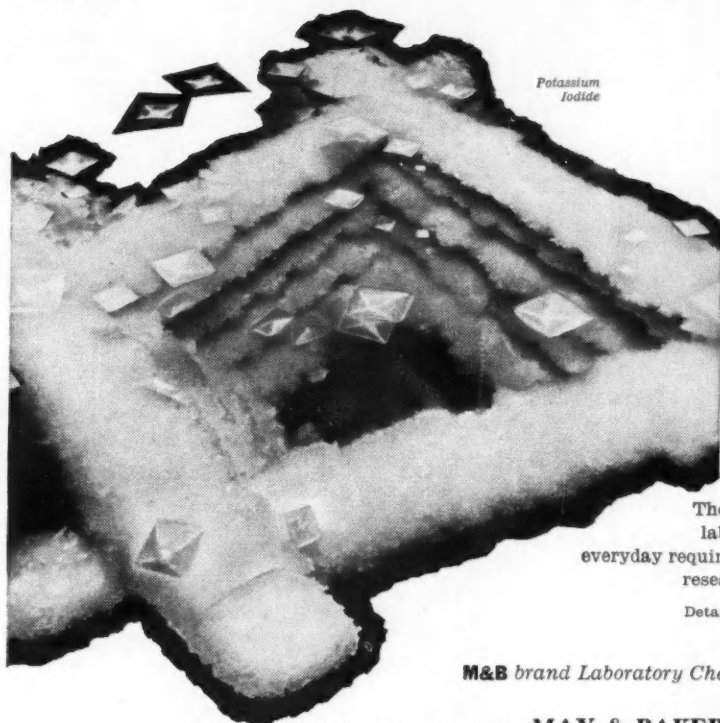
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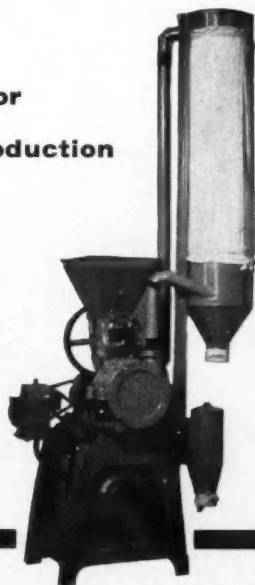
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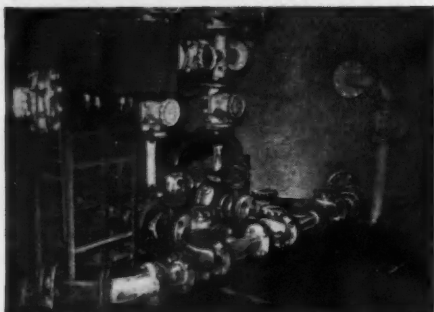
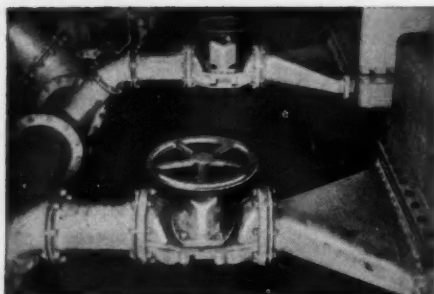
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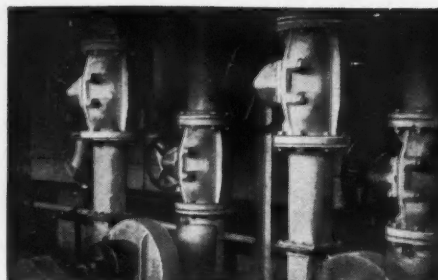
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